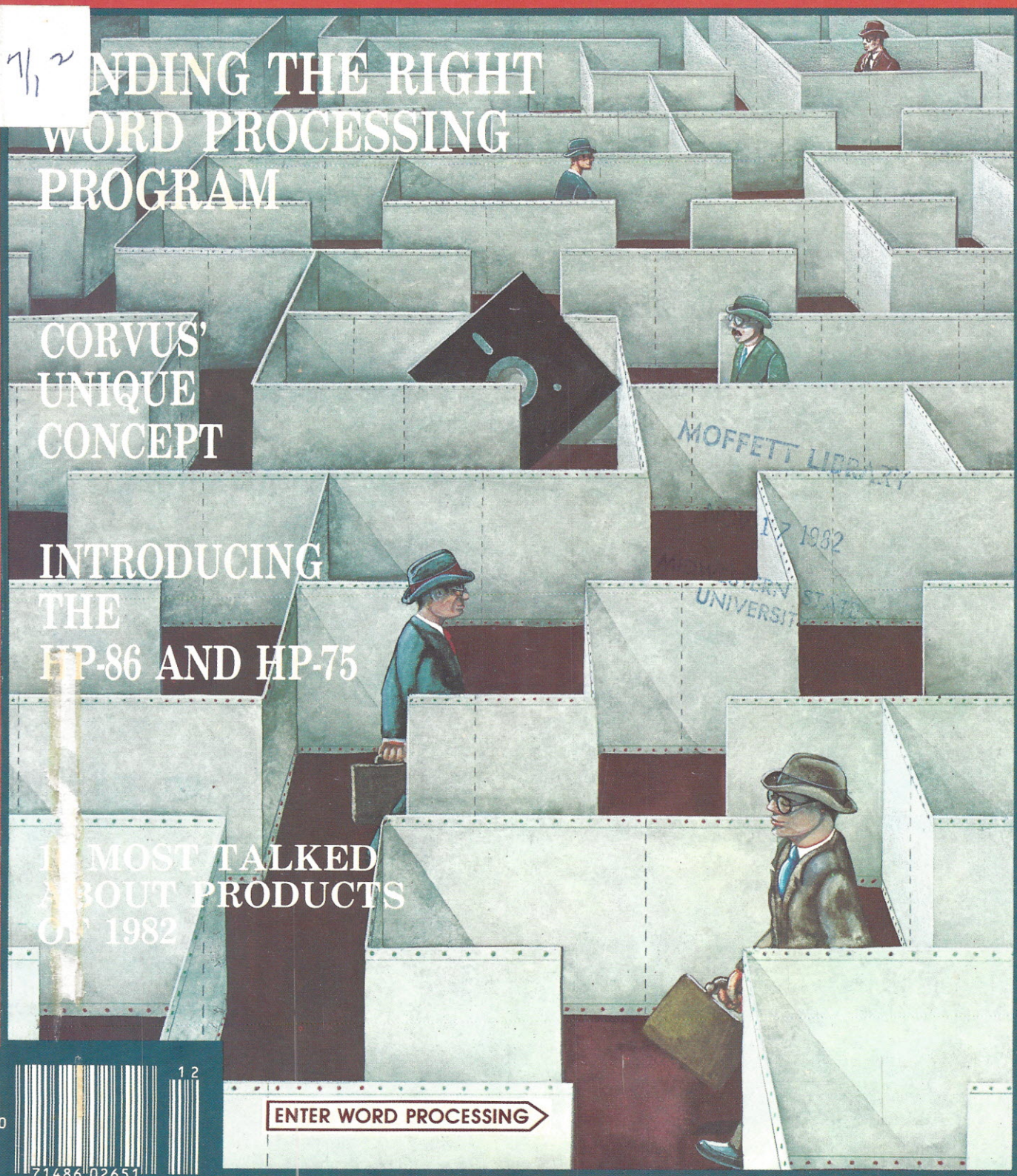
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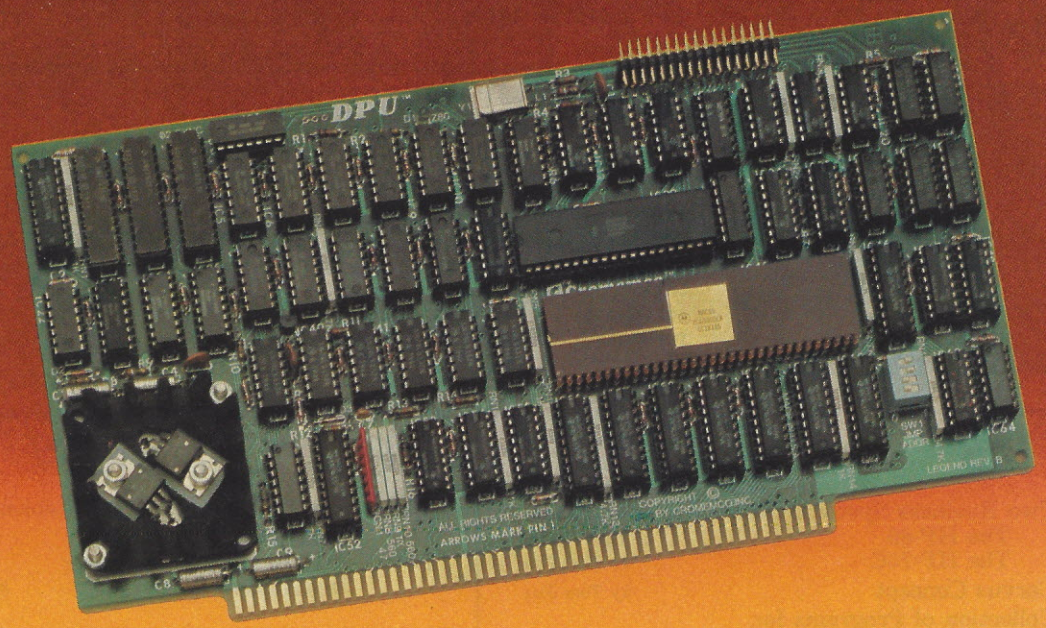
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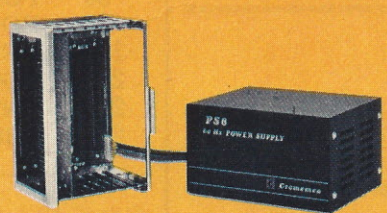
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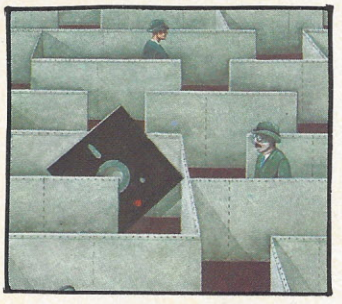
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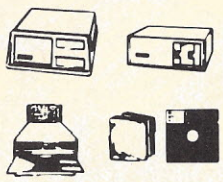
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CIRCLE NO. 20 ON INQUIRY CARD

EDITORIAL



Les Spindle
Managing Editor

Introduced in 1975, *Interface Age* has evolved alongside the maturation of the microcomputer industry itself. As computers have made their way from elite tools for hobbyists and large corporations to everyday commodities for the average citizen, computer publications have, likewise, adapted to a changing readership. "Trade" and "consumer" publications are two very different breeds. Trade publications tie in closely with the industry and are mostly read by its members. Consumer publications must walk a tightrope—working closely with manufacturers to ensure accurate product information, while maintaining editorial independence to report honest appraisals of the products. The only useful consumer publication is one wherein the reader receives unbiased reactions to the products at his disposal.

From time to time, we run into outdated and inappropriate practices that were widespread in the early days of microcomputer publications, but are no longer feasible. We take a firm stand to stamp out these practices—often meeting with strong resistance from individuals who are used to different procedures. For example, it is brought to our attention almost every day that authors of computer articles are quite accustomed to sending advance copies of scheduled articles to manufacturers for "technical approval." And the companies often expect this—perusing the articles and responding with their comments. We hear this often enough to assume that some consumer publications are still following this practice.

During this process, I'm quite sure, some technical fluffs are caught that may have slipped by the author and the editor. But, in the meantime, the worth of the article as a consumer piece has been destroyed. Not only has the reviewer been intimidated by the knowledge that the company will be reading all of his opinions prior to publication, but the company (understandably) will not limit its comments to strictly "technical" matters. The result is a watered-down evaluation—not an independent editorial judgement. Aside from creating major squabbles among the editor, the company and the author, the reader is severely shortchanged. Under any circumstances, this is not ethical journalism. In the case of consumer-advice articles, it is simply inexcusable.

The solution to the dilemma is careful attention to technical detail on the part of the author—and thorough consultation with the company about any technical facts or product features that may be unclear. This is the only way to offer a credible editorial appraisal.

Besides ensuring editorial independence among our editorial staff, we have many consumer-oriented special projects in the works for 1983. Our detailed comparison articles will survey a wider range of products than ever before. We will continue to increase our number of review articles—also covering a wider range of products. We are working closely with reviewers to ensure consistent review criteria and thorough product testing. We are planning more implementation tips, case studies, advice on product selection criteria and service/after-sale support information. Our goal is to help the perplexed business computer consumer cut through the maze of decisions that confront him.

We would appreciate any feedback you can offer as to how our publication can be more useful. Your hints will be important as we firm up our 1983 editorial plans. It promises to be an exciting year, and we intend to provide you with thorough, unbiased coverage of all the latest developments.

Les Spindle



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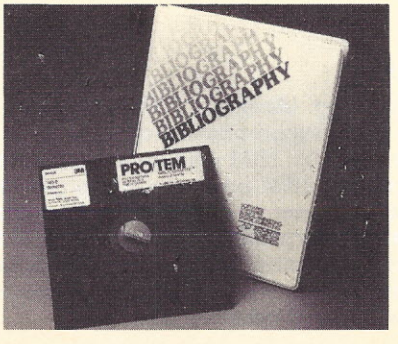
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CIRCLE NO. 29 ON INQUIRY CARD

Two-way computer communications installed in hotel rooms

Travelhost, Inc. (Dallas, TX) has announced plans for the first in-room computer for hotel guest use. Now in its final stages of testing, it is expected to be installed in hotels throughout the U.S. beginning in February, 1983. The 24-hour electronic communications system brings computer science into the hotel room as part of the hotels' overall amenities packages.

A guest will be able to send and receive messages to and from clients and employees in the field or home office; make or change airline reservations; check addresses and menus at restaurants; order gifts, peruse stock market quotations; and get lists of real estate agents, etc.

The development and implementation of the network is being directed by Dr. Lee H. Smith, president of Travelhost, Inc. and former president of Southwest Texas State University. The terminal weighs three-and-a-half pounds and has been designed to be compatible with existing in-room television sets.

To use the network, one simply turns to the correct channel on the in-room TV, pushes the computer ON button, and inputs his or her Visa, MasterCard or American Express number. No posting is required by the hotel.

Enhancements for IBM PC

New communications capabilities enable the PC to be connected to a host computer using IBM's (Boca Raton, FL) most advanced communications protocols, and to emulate the widely-used IBM 3270 and 3101 terminals. In addition, the company also announced a new National Sales Support Program that combines the resources of participating authorized IBM PC dealers with those of IBM's national marketing divisions. The program is designed to serve users who purchase individual systems as part of special large volume agreements entered into by their college, university or employer. The National Sales Support Program is an extension of IBM's current large volume marketing program for the Personal Computer.

Ethernet becomes affordable

With the popularity of local area networks as a way of improving office automation, it is becoming more important to obtain low cost methods of interconnecting small business computers. The recently introduced Ethernet single chip controller from SEEQ Technology, now makes it possible to reduce the cost of direct connection to this network. The 8001 Ethernet Data Link Controller (EDLC) will first find its way into the end user's computer system on a plug-in board from 3COM Corp., a long-time supporter of Ethernet (*IA* Jul 1982).

The new EtherLink controller board along with the companion application software is priced at $950 in single quantities. The initial product will support the IBM PC but other members of the EtherSeries family are planned for introduction in the near future.

Expansive trade show

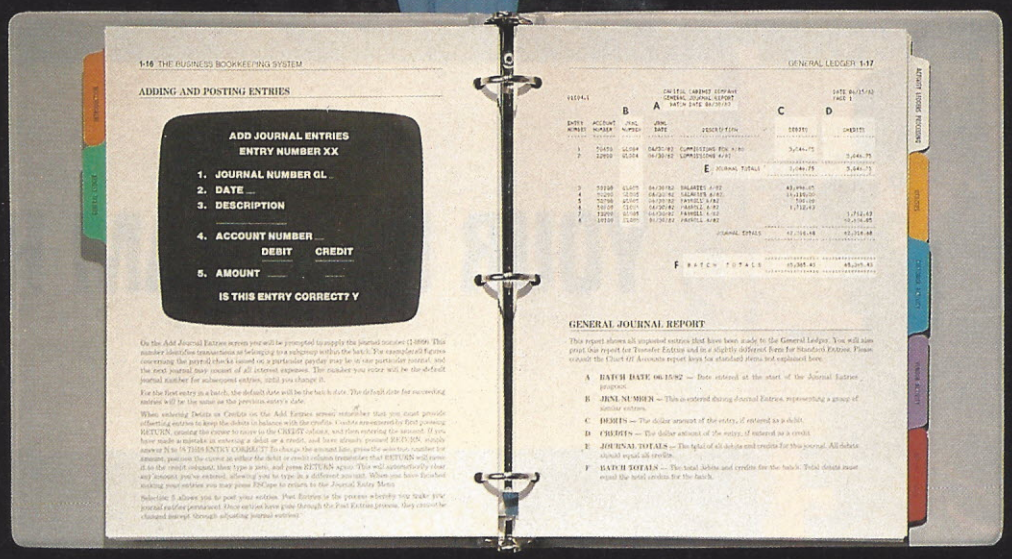
Wescon/82, the nation's largest high technology electronics exhibition and convention, has set a record for attendance both in the history of the show and in the history of California's Anaheim Convention Center. The three day event held in September attracted 78,618 management and engineering professionals who are involved in design, testing and manufacturing of electronic components and systems. It had 725 exhibitors and 1,435 booths which prompted the addition of two air-conditioned satellite structures to accommodate the overflow. 31,155 design/systems engineers, assemblers, systems integrators, software specialists and corporate management also viewed the 182 exhibits at the Disneyland Hotel Convention Center which comprised the simultaneously scheduled Mini/Micro show.

Proprietary secrets shared

International Business Machines Corp. (Armonk, NY) filed a civil lawsuit against Bridge Technology Inc. and three IBM employees for misappropriation of IBM trade secrets. In the lawsuit IBM alleges that Bridge Technology was founded by IBM employees earlier this year and attempted to sell design information relating to unannounced IBM products in the personal computer field.

Tecmar Inc., a Cleveland manufacturer of electronic data processing products in the personal computer field was offered design information. The president of that company became concerned that the designs might contain confidential information and immediately contacted IBM.

The complaint charges the defendants with misappropriation of trade secrets and willful breach of agreements. It seeks compensatory and punitive damages.



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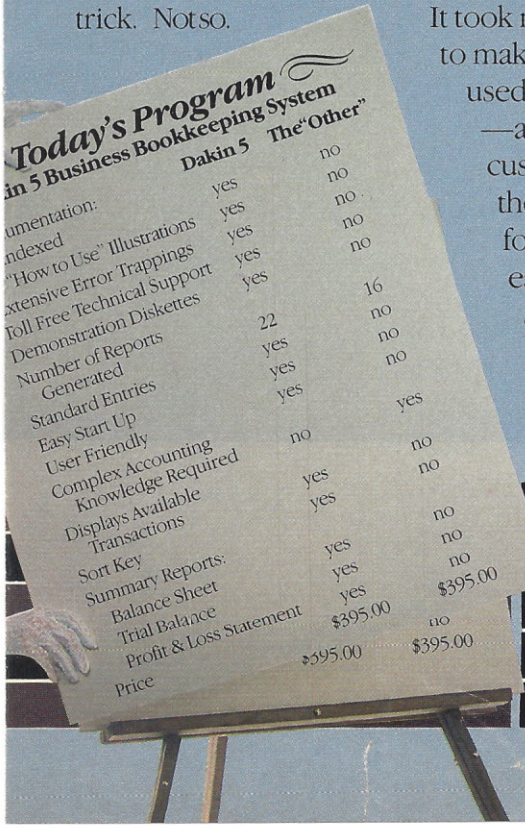
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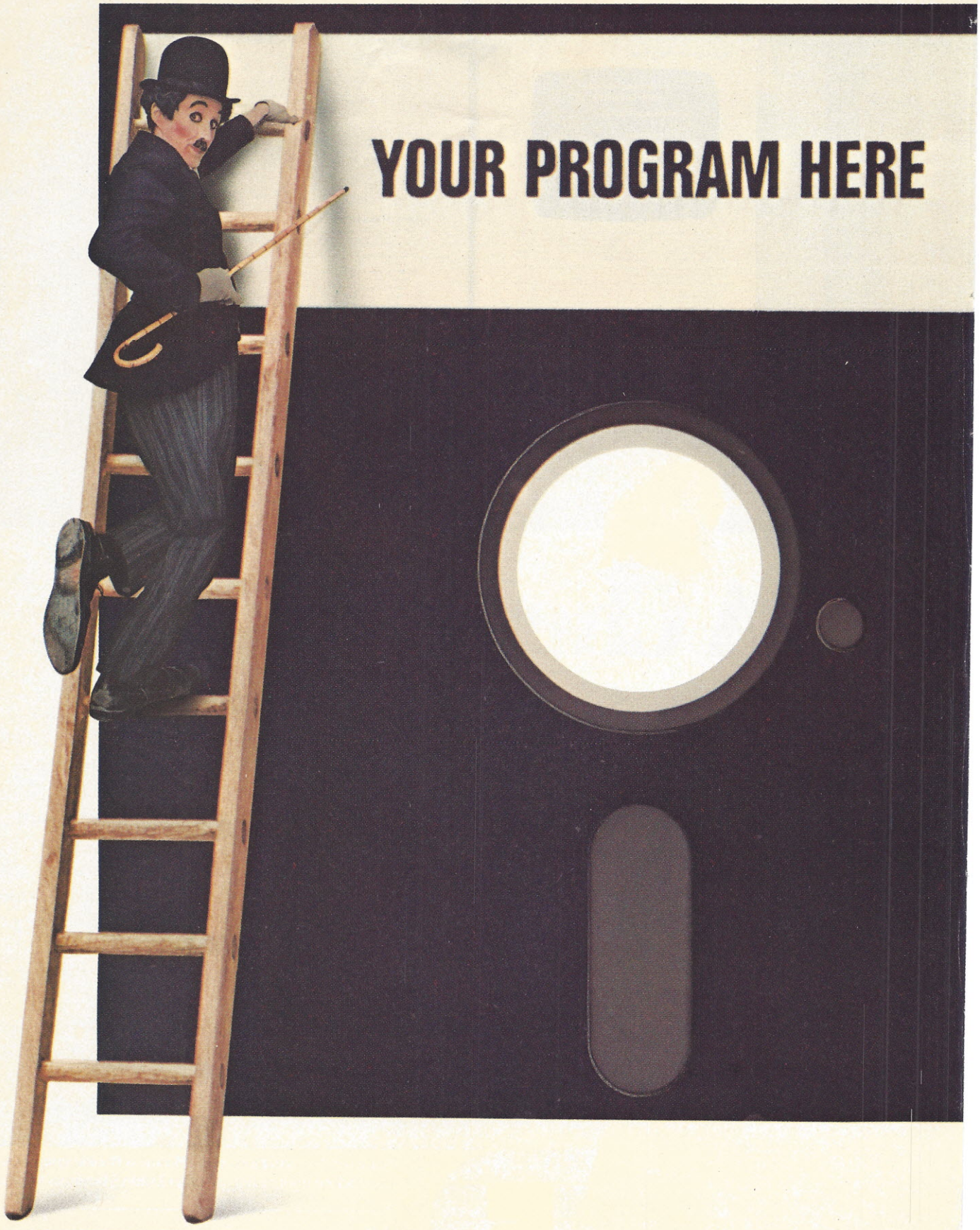
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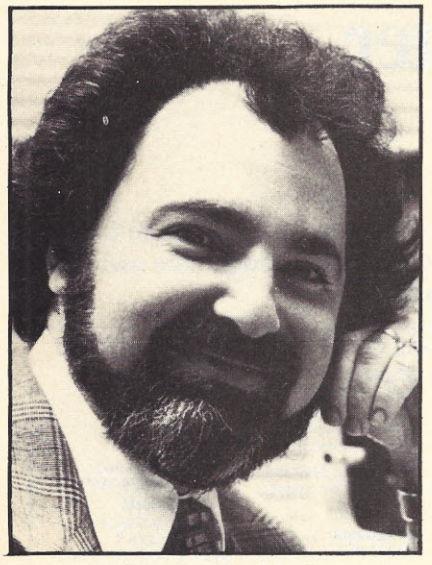
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CIRCLE NO. 41 ON INQUIRY CARD

OPINION



Harry J. Saal
President
Nestar Systems, Inc.

The personal computer industry, new as it is, seems about to embark on a classic death spiral of re-invention. Life was much simpler in the days of the first computer systems. We walked up to them, loaded a paper tape or deck of punched cards, did our own testing and running of programs, and walked away, leaving an empty machine for the next user. The system software was spartan but robust. It only had to deal with one user at a time.

Because computers were so expensive, this mode of operation was eventually replaced, first by batch operating systems, then by time sharing systems. With these systems, a far larger fraction of the computer's resources could be used in a given period of time. Instead of standing idle while users fiddled with decks of cards or switches, computers used monitor programs to run jobs sequentially from tape input. With time sharing, the computer shifted its attention from user to user. While one user thought about what to do next, another's program could run. Efficiency was the driving factor in the tuning of these systems. An idle computer was an expensive, under-utilized resource.

The development of timesharing was not without its problems. The required monitor programs were much larger than the more primitive, single-user programs. Larger means more memory. Larger means more errors. Larger means fatter, more complex manuals. Running different programs on one machine also means that failures in one program might affect others, destroying data files and memory contents. Memory protection and segmentation just made the system bigger and more complex. Piece upon piece of the patchwork quilt was added to "improve" the system. Unfortunately, the end result is a collection of ungainly, unfriendly systems of such complexity that further improvements are self-limiting. For every bug fixed, five more are introduced.

Meanwhile, the silicon people have been busy at work, building microprocessors—computers on a chip. These were originally designed for control applications, but when clever engineers decided to put them in desktop systems, with memory, keyboard and a display, the personal computer was born.

And what a wonderful thing it was. Crude and brash, like the first big computers, but small enough to get your hands around. You could sit down with a listing of the system ROM and see how it worked. You could stop a program, check its variables, make a change, and continue. No searching through thousands of pages of documentation to learn how to do something. Run a program with no waiting, since the computer isn't shared. Learn graphics and produce amazing effects, using the computer's full power.

And then one day, even though personal computer systems were very economical, someone observed that hooking terminals to them reduces the price per user. Multi-user software emerged—and yes, that software is bigger and more complex, with more bugs than ever before. Today's 16-bit chips have all the power that used to come with a good sized minicomputer, traditionally shared among many users. The engineers are busy building multi-user systems again. For example, Ed Juge, Director of Computer Merchandising for Tandy/Radio Shack was asked recently if the new TRS-80 Model 16 would ever function as a personal machine. "The prospects are absolutely zero," Juge replied.

Have we forgotten why we built multi-user systems in the first place? The economics of production and marketing have changed since then. The cost of "computing power" and memory no longer dominates. The efficient use of processing power is not critical in the way that it was for old mainframes. We don't need to write operating systems that will squeeze an extra 10% out of our microcomputers. Peripherals, too, can now be effectively shared using well-understood technologies, such as local area networks. But the rush is on to reinvent the past. We'll probably do a better job this time around, but only a little better. It's sad to watch the computer industry abandon its moment of innocence so soon.

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PRODUCT HIGHLIGHT



Epson QX-10/Valdocs System

This attractive new offering produced by the company that has collared about 75% of the printer market houses a Z80 microprocessor and 128K bytes of memory, which can be expanded to 256K bytes. The Epson (Torrance, CA) QX-10 contains two direct memory access controllers, a free serial port, a Centronics-compatible parallel port, six clock-timers, 2K bytes of CMOS memory, a clock/calendar and light-pen interface. It has internal space for five peripheral cards. The operating system is TP/M—an enhanced version of CP/M. Basic and Stoic languages are provided. It also incorporates two ultra-thin profile 5.25-in. double-sided, double-density floppy disk drives and a video display offering 128K bytes of dedicated memory. It can function in 25-line by 80-character mode or 640-by-400 pixel.

The most significant aspect of the system's hardware is the unique keyboard designed by Rising Star (Torrance, CA). It features a set of clustered function keys based on common operations. The concept behind it is labeled HASCI for Human Applications Standard Computer Interface. The System, File, Application and Typestyle controls are designed to provide maximum efficiency for users with limited computer familiarity. It is one of the friendliest layouts available.

The software included is called Valdocs (apparently a take-off on "valuable documents"). This advanced program is designed to make maximum use of the hardware's capabilities and is based on the manipulation of our four primary symbol categories: letters, numbers, graphics and time. It provides a sophisticated word processor, file system, four-function calculator, graphics capability and events scheduler. Telecommunications and electronic mail are supported. Extensive help facilities and a general tendency toward making operations transparent to the user promise to result in a highly accessible system for beginners. A full evaluation of the system (which will sell for under $3,000) will appear soon in *IA*. Interestingly, the QX-10 will be available in two configurations—the one described above and also one with a conventional layout keyboard interacting with the standard CP/M operating system.



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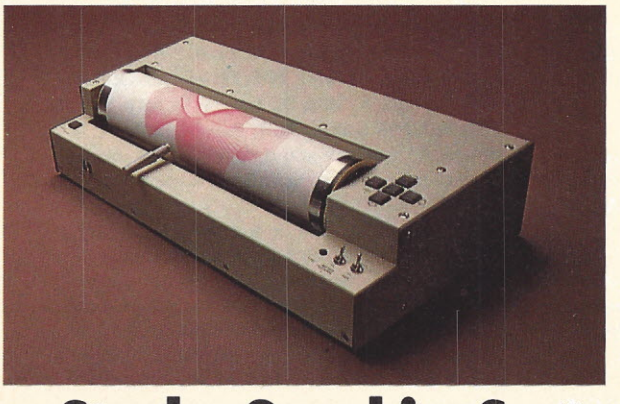
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LARGE SELECTION OF PRINT CAPABILITIES—The 7x9 dot matrix allows user selection of 10, 12, 15 or 17 characters per inch or the 11x9 serif font provides document quality printing at 10 characters per inch.

"SoftSwitch™" FRONT PANEL CONTROL—The PrintMate™ 150 A models have SoftSwitch™" front panel keypads for externally changing forms length, print density, horizontal and vertical tabs, baud rate and character set. A simple "SoftSwitch™" entry will display the operating mode you have selected and PrintMate™ 150 responds to every entry with a pleasant tone of confirmation. With the "SoftSwitch™", you can turn off the printer—even unplug it—and PrintMate™ 150 will retain every detail in its non-volatile memory. The "SoftSwitch™" may be added to the PrintMate™ B models.

EXPANDABLE PRINT BUFFER—PrintMate™ 150 models A2 and B2 have a factory installed 16K buffer. Both the 4K buffer model A1 and the standard 2K buffer model B1 are optionally expanded in increments to 16K. The PrintMate™ 150's expanded buffer allows application extensions for high speed interleaved printing and spooling, greatly improving the host computer's performance in applications that are print bound.

DOWNLINE LOADABLE FONTS—The powerful microprocessor based command set of the PrintMate™ 150 allows a custom character set to be developed in the host computer and downloaded to any PrintMate™ 150 model with a 4K or larger buffer.

GRAPHICS—The standard graphics capabilities of all PrintMate™ 150 models allow printing of up to 6,120 individually addressable dots per square inch giving exceptional resolution for graphics and special characters.

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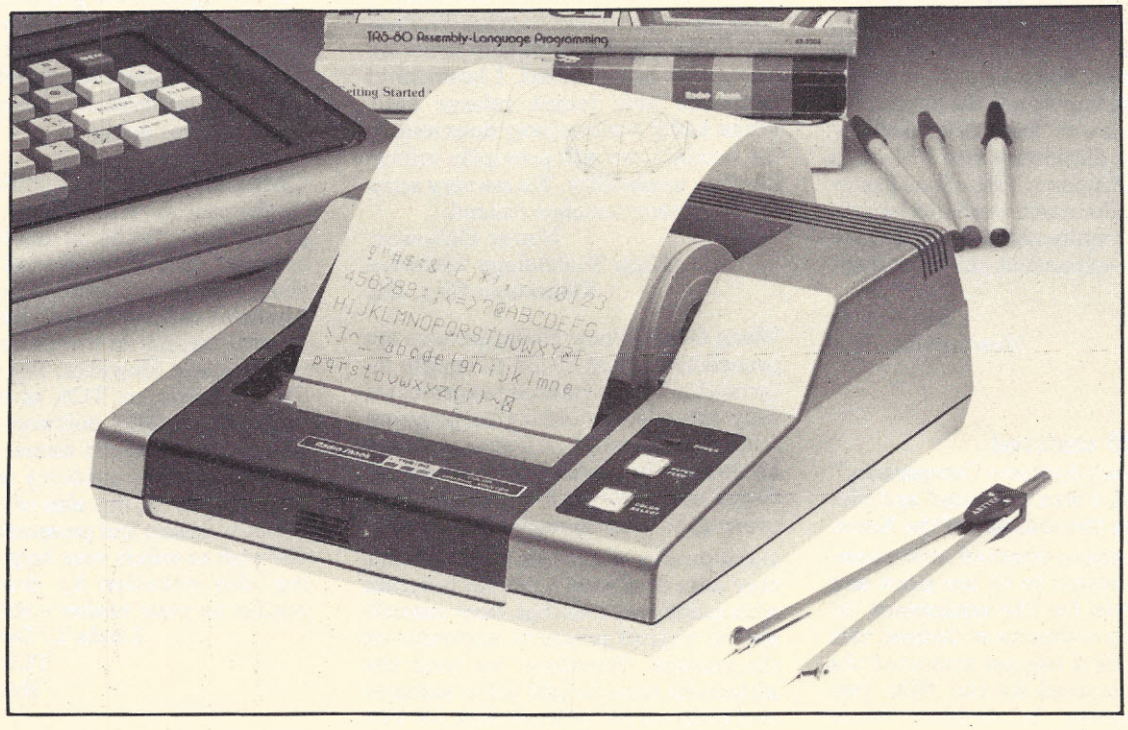
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CIRCLE NO. 59 ON INQUIRY CARD

LETTERS



Printer photo correction

Re: "New Products" (*IA* Sep 82), the item on the Radio Shack Color Graphics Printer model 26-1192 (page 116) was inadvertently submitted with the wrong photo. The correct photo (printed above) is provided for clarification.

Martin B. Winston
Radio Shack
Fort Worth, TX

Reliable Source

Re: "Learning with Micros" by Louis E. Frenzel, Jr., I would like to thank you for mentioning Colorado Technical College and the fact that we offer courses via *The Source*. However, I feel it is pertinent to call to your attention a few errors. *The Source* does not offer college courses through the network; Colorado Technical College offers courses through *The Source*, which is the telecommunications system. Also, CTC offers no degree programs via telecommunications. Only specific courses are available through *The Source*.

Marty Zenthoefer,
Colorado Technical College,
Colorado Springs, CO

Bugs in the pocket?

Re: "Power in Your Pocket" by Bob McElwain (*IA* May 82), I'm having difficulty with the "Budgets: A Different Approach" program.

After pushing little keys for an hour to put the program into my TRS-80 pocket computer, I wasn't rewarded for my efforts.

When I tried to run the program, I got an error symbol on line 230. E=INT(A(J)/A(F)100.5)/10.

I repeatedly tried to correct it, but could not run the program past line 230. Please let me know if there were any mistakes in the program or typos in the article.

Gary S. Crouch,
Rancho Cordava, CA

I'm at a loss in identifying your difficulty. There's nothing wrong with line 230 as published (although, you left out a plus sign in your letter to me). Unfortunately, I haven't enough information to determine where your error might be. I suspect, however, it's in the computation of F or A(F). If F is incorrect, A(F) could be zero and division by zero is not allowed. With this in mind, I'd check all lines in which F is computed or A(F) is referenced. If you continue to have difficulty, send me a listing and I'll check it for you. Hope you find the trouble easily. —**BM**

Dictionary hash

Roger Garrett's "Inventor's Sketchpad" (*IA* May 82) presents an extremely attractive suggestion for spelling checkers that use little memory for their dictionaries. Unfortunately, this attraction is based on defying the rules of probability.

Garrett proposes hashing dictionary words into a set of possible hash-codes, set up so that approximately half of the codes will get used. A bit map then shows us which codes correspond to good words and which do not. A 50,000-word list would thus be coded into a 100,000-bit map, about 12K bytes, which seems a reasonable amount of memory to use in a microcomputer. Garrett says the hashing technique makes the probability of a given word "hashing to a unique bit in the (bit map) extremely high," which I assume means the chance of a given word colliding with some other word is very low.

But using any straightforward hashing method, the postulated 50% density and the standard Poisson probability distribution predict that roughly 40% of the words will be involved in hashing collisions, representing about 10% of the possible hash-codes. The only ways to get a very low collision rate are: to greatly reduce the density, by making the bit map size much larger or the dictionary much smaller; or to find some amazing mathematical relationships in the spelling of (English?) words, and base the hashing technique on them.

The real problem is not the high collision rate; it is the high occupancy rate of the bit-map, which would be roughly 40% chance that its hashcode will match that of a valid word—thus such a "dictionary" would miss 40% of misspellings. Again, the only ways to improve this would be to reduce the

density or find the magic hashing rule.

In the absence of details on the latter, one can only believe that it is yet to be discovered. Without such a magic rule, the only way to get the advertised error rate as low as 'one in several billion' is to put the dictionary into a bit-map having an occupancy rate of one in several billion. For a one-word dictionary, this would require about one gigabyte of memory—somewhat straining most micros.

Robin Ault
Newtonville, MA

Xerox 820 omitted

Re: "Hardware Systems Comparison," (*IA* Aug 82), I was surprised and disappointed by the omission of the Xerox 820, a business-oriented microcomputer that seems to fit the price and other criteria for the equipment included in the comparison. Indeed, this system, while it has not attracted the attention received by the IBM Personal Computer, is certainly better known and more widely used than most of the equipment listed and commented on in your article.

Derrick A. Bell, Jr.
Eugene, OR

While the comparison articles are intended to present a generous sampling of available products, they cannot possibly include everybody's favorite system. Look for a review of the Xerox 820 in next month's issue—**ed.**

Premature announcements

Re: "Buyer's Guide to Payroll Packages" (*IA* Sep 82), I was disturbed to find two products that as yet have not been fully developed, let alone released. The problem is perhaps not with your organization but with the over-zealous software producers who are out touting products that do not yet exist. Trying to track down software is difficult enough without the frustration of being led up blind alleys by people displaying fiction and calling it fact.

Dave Fochtmann,
Oak Park, IL

See letters below —**ed**

I would like to apologize to *Interface Age* and its readers for a mistake we made regarding the release of a payroll software package. For reasons beyond our control, it was not released on schedule and is still not available. This payroll product was being developed by an outside contractor that failed to meet its commitment to High Technology Software and since this situation has yet to be remedied, I hesitate to announce new target release date. When and if our company does release the product, we will promptly inform *IA* of its availability. We are very sorry for any inconvenience caused.

Nancy Galloway,
High Technology Software
Oklahoma City, OK

When Great Plains Software was approached in April by *IA* to supply information on our payroll program, we fully intended to have this program released in September. But as you may be aware, the development of exceptional software does not take place overnight. After many calls from end-users, dealers and CPAs, we found that they were in need of a payroll program with many features that were unavailable in payroll products currently on the market. Therefore, we took the additional time to add these features and delayed our release date for two months. By doing so, we have developed a software program that, we feel, is very good.

We apologize for the inconvenience this has caused *IA* and the many businesses that are anxiously awaiting our payroll program. By the time this issue is distributed, our product will have been introduced at the Las Vegas Comdex show.

Rhonda McMillan
Great Plains Software

The program included in the inventory control comparison (*IA* Oct 82) has taken longer in testing than anticipated. When contacted by *IA* to take part in the survey, we expected the program to be available at the time of publication. Due to the nature of the software industry, we want to take extra effort in ensuring that an error-free product is provided for the business community, so we now expect this program system to be available early in 1983.

Kathy Farmer
Continental Software
Los Angeles, CA

Sorry, wrong number

Re: "Update" (*IA* Oct 82) thank you for mentioning our new Tickerscreen service. Unfortunately, the telephone access number was issued with the wrong area code. The correct number is (212) 986-1660.

Max Ule
New York, NY

Our apologies to the gracious and very patient lady who had a phone number corresponding to the printed area code. She patiently endured calls from many computer enthusiasts asking her for stock market advice. —**ed.**

Company name clarification

In the past several months, the Computer Store (TCS), a hardware and software distributor located in Massachussetts, has experienced significant financial difficulties, documented in several articles in computer industry publications. However, The Computer Store's acronym, TCS, is completely unrelated to TCS Software—our corporate and common name.

This negative publicity is not only troubling to us, but also of concern to both our dealers and prospective dealers. We wish to solicit your help in correcting this situation by drawing this matter to your reader's attention.

Linda L. Duttenhaver
TCS Software
Houston, TX

Format feedback

I am writing to give you some feedback on your new editorial policies and magazine format. I am pleased with your business orientation and have enjoyed the articles. My only suggestion along those lines is to not be quite so middle-of-the-road in terms of article depth. I would think that some articles more oriented towards less sophisticated users—and some for the more advanced user/programmer (applications developer for business)—would be appropriate.

Chris H. Morgan
Carrollton, TX

Payroll survey addition

Re: "Buyer's Guide to Payroll Packages" (*IA* Sept 82), I wish to compliment your survey, especially charts 1 and 2. This very complex subject has obviously been extensively-researched by your staff and reported in a very clear and concise manner. Your qualification statement was most fair to all and, it is with this in mind, that we thought it timely to bring our Complete Business Accounting Program to your attention, inasmuch as it not only includes an integral module; it is also interactive with the rest of the program.

We look forward to your next updated reprinting of Chart 2 to note the most recent progress within our industry, as well as to see how we compare.

R.J. Vesaas
GOCI Software,
Edina, MN

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CIRCLE NO. 79 ON INQUIRY CARD

CALENDAR

Dec 3-4 Greeley, CO, *General computer fair* will include exhibits and seminars. CSU Extension, 425 N. 15th Ave., Greeley, CO 80631.

Dec 6-8 Boulder, CO, *International Teleconferencing Symposium* will feature prominent speakers and provide live demonstrations. Cross Information Co., 934 Pearl, Suite B, Boulder, CO 80302.

Dec 8-9 Dallas, TX, *Business-Expo* will feature high technology business products and services from over 250 companies. It will also include seminars on business technologies. Business-Expo, 702 E. Northland Towers, Southfield, MI 48075.

Dec 8-9 San Jose, CA, *Compusource show* will offer OEMs and sophisticated end-users 100 exhibits and many educational sessions. Norm DeNardi Enterprises, 289 S. San Antonio Rd., Suite 204, Los Altos, CA 94022.

Dec 9-12 Atlanta, GA, *Computer Show and Office Equipment Exposition* will display a broad range of products. Computer Expositions, Inc., P.O. Box 3315, Annapolis, MD 21403.

Dec 13-15 Ann Arbor, MI, *International conference on information* systems will present a wide range of viewpoints and topics. Information Systems Research Group, University of Michigan, Ann Arbor, MI 48109.

Jan 17-21 Los Angeles, CA, *Technical symposium and instrument exhibit* will have displays and tutorials on subjects ranging from semiconductors to optics and lasers. SPIE, P.O. Box 10, Bellingham, WA 98227-0010.

Jan 19-24 New Orleans, LA, *Audio visual convention* will have over 400 exhibitors from both communications and information technologies, and include seminars and workshops. NAVA, 3150 Spring St., Fairfax, VA 22031.

Jan 20-21 Palo Alto, CA, *Measurement Science Conference* will promote free exchange of emerging technologies in the field of measurement science. William Browne, Jr., Marotta Scientific Controls, Boonton, NJ 07005.

Jan 21-24 New Orleans, LA, *Commtex International Exposition* is designed to bring products of communications and information technologies together. National Audio-Visual Assoc., 3150 Spring St., Fairfax, VA 22031.

Jan 27-29 San Diego, CA, *Computer simulation multiconference* will combine basic modeling on micros, emergency planning and inventory and production control. SCS, P.O. Box 2228, La Jolla, CA 92038.

Jan 31-Feb 2 New Orleans, LA, *Communication Networks* will address telecommunication applications: electronic mail, voice mail and teleconferencing. It will be supplemented with hands-on demonstrations by vendors displaying products and services. New Orleans Communication Networks Conference and Exposition, Box 880, Framingham, MA 01701.

Feb 1-5 New York, NY, *Kuwait Info* will encompass diverse areas such as computer software, hardware, peripherals, office furniture, micrographics, data communications, word processing, dictating systems, information transmission, telephone systems, computer accessories, duplicating and copying, record-keeping and environment controls. Clapp & Poliak Int'l, Box 70007, Washington, D.C. 20088.

Feb 14-17 Orlando, Fl, *Eleventh Annual Computer Science Employment Register* aids in matching computer scientists and data processing specialists with employment opportunities. Computer Science Employment Register, University of Pittsburgh, Pittsburgh, PA 15260.

Feb 21-23 Philadelphia, PA, *Office Automation Conference* will feature more than 200 technological exhibits. Technical sessions will explore advanced office technology, communications, current office technology/systems, human factors and social issues, management and organizational issues and systems integration. AFIPS, 1815 N. Lynn St., Arlington, VA 22209.

Feb 25-27 Orlando, FL, *Computer Expo* will emphasize mini and micro computers, and include hardware, software, word processing, graphics, peripherals, supplies, services and computer furnishings. Tom Blayney, Box 1185, Longwood, FL 32750.

Mar 8-9 Austin, TX, *SIGCOMM Symposium* will cover communication architectures and protocols. Topics will include state-of-the-art network architectures, algorithms and protocols for data communications, theory and practice based on software design for specific applicaitons and/or specific technologies. The Mitre Corp., 1820 Dolly Madison Blvd., McLean, VA 22102.

Mar 10-12 Hartford, CT, *National Topical Conference* will include insight into how microcomputers work; how to evaluate hardware and software; administrative uses; data management; computer-assisted instruction; computer languages; programming and the use of microcomputers to assist the handicapped. The Council for Exceptional Children, 1920 Association Dr., Reston, VA 22091-1589.

Mar 14-17 Washington, D.C., *Federal Office Systems Expo* will cover professional productivity increase through office automation. Sessions are planned for word processing, data processing, records management, micrographics, telecommunications and computer graphics. National Trade Productions, Inc., 9418 Annapolis Rd., Lanham, MD 20706.

Mar 17-19 Tempe, AZ, *Microcomputers in Education Conference* will consist of workshops, demonstrations and presentations designed for anyone interested in microcomputer applications in education. Arizona State University, Tempe, AZ 85287.

Apr 13-20 Hanover, West Germany, *Hanover Fair* is the world's largest industrial trade exhibition, and will place special emphasis on exhibiting the latest technology in industrial robotics. Hanover Fairs Information Center, Box 338, Whitehouse, NJ 08888.

We invite sponsors of upcoming events to submit notices for inclusion in Calendar. *Send a brief description, along with full address, phone number and contact person to: Calendar, Interface Age, P.O. Box 1234, Cerritos, CA 90701. Items must arrive no later than 90 days prior to the event to be considered.*

WHEN WE ANNOUNCED THE COMMODORE 64 FOR $595, OUR COMPETITORS SAID WE COULDN'T DO IT.

THAT'S BECAUSE THEY COULDN'T DO IT.

The reason is that, unlike our competitors, we make our own IC chips. *Plus* all the parts of the computer they go into.

So Commodore can get more advanced computers to market sooner than anybody else. And we can get them there for a lot less money.

WHAT PRICE POWER?

For your $595,* the Commodore 64™ gives you a built-in user memory of 64K. This is hundreds of dollars less than computers of comparable power.

Lest you think that the Commodore 64 is some stripped-down loss leader, a look at its available peripherals and interfaces will quickly convince you otherwise.

SOFTWARE THAT WORKS HARD.

The supply of software for the Commodore 64 will be extensive. And with the optional plug-in Z80 microprocessor, the Commodore 64 can accommodate the enormous amount of software available in CP/M®.

Add in the number of programs available in BASIC and you'll find that there are virtually no applications, from word processing to spreadsheets, that the Commodore 64 can't handle with the greatest of ease.

PERIPHERALS WITH VISION.

The Commodore 64 interfaces with all the peripherals you could want for total personal computing: disk drives, printers and a telephone modem that's about $100, including a free hour's access to some of the more popular computer information services. Including Commodore's own Information Network for users.

RUN YOUR BUSINESS BY DAY.
SAVE THE EARTH BY NIGHT.

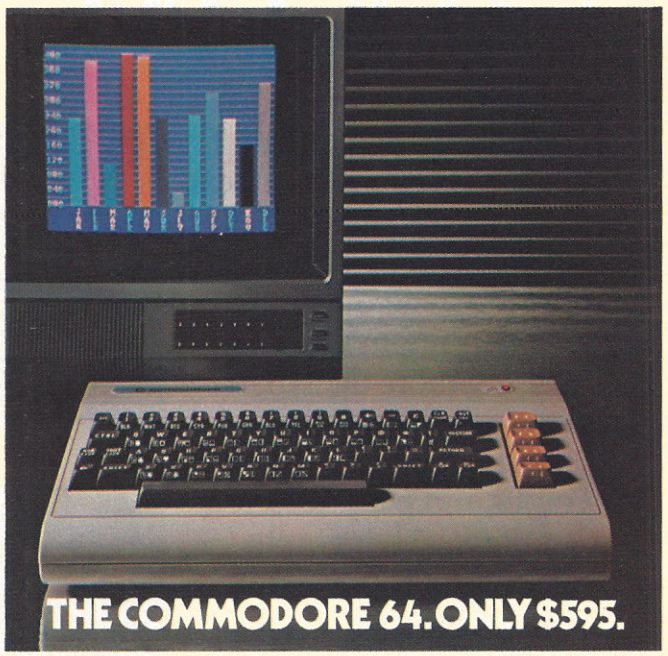
At the end of a business day, the Commodore 64 can go into your briefcase and ride home with you for an evening's fun and games.

Because of its superior video quality (320x200 pixel resolution, 16 available colors and 3D Sprite graphics), the Commodore 64 surpasses the best of the video game machines on the market. Yet, because it's such a powerful computer, it allows you to invent game programs that a game machine will never be able to play; as well as enjoy Commodore's own video game cartridges.

ATTACK, DECAY, SUSTAIN, RELEASE.

If you're a musicologist, you already know what an ADSR (attack, decay, sustain, release) envelope is. If you're not, you can learn this and much more about music with the Commodore 64's music synthesizing features.

It's a full-scale compositional tool. Besides a programmable ADSR envelope generator, it has 3 voices (each with a 9-octave range) and 4 waveforms for truly sophisticated composition and playback—through your home audio system, if you wish. It has sound quality you'll find only on separate, music-only synthesizers. And graphics and storage ability you won't find on any separate synthesizer.



DON'T WAIT.

The predictable effect of advanced technology is that it produces less expensive, more capable products the longer you wait.

If you've been waiting for this to happen to personal computers, your wait is over.

See the Commodore 64 soon at your local Commodore Computer dealer and compare it with the best the competition has to offer.

You can bet that's what the competition will be doing.

Commodore Business Machines
Personal Systems Division
P.O. Box 500, Conshohocken, Pennsylvania 19428

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Company_____

Address_____

City_____ State_____

Zip_____ Phone_____

commodore COMPUTER

IA/12

*Manufacturer's Suggested Retail Price: July 1, 1982. Disk drives and printers are not included in prices. The 64's price may change without notice.

CP/M® is a registered trademark of Digital Research, Inc.

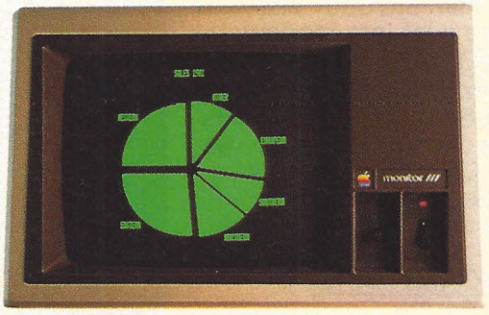
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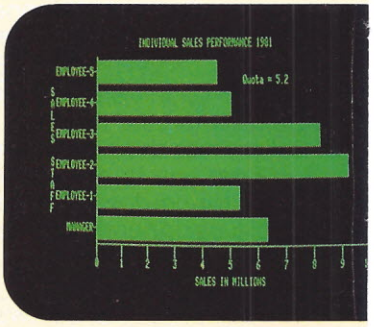
Not all business
And we've got the

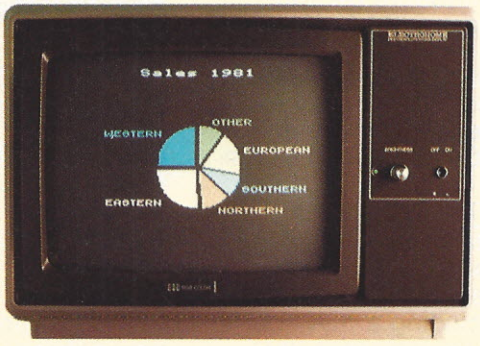
As you know, one picture is worth a few thousand numbers.

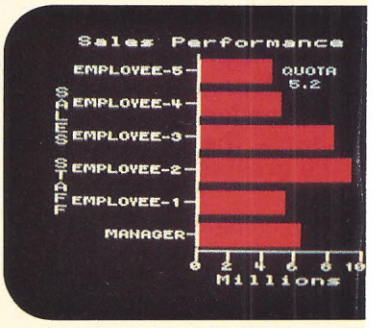
As you may not know, Apple® Business Graphics software can generate more types of pictures, in more colors, using more data than any other graphics package.

So you not only get the usual bar graphs and pie charts. You also get unusual bar graphs and pie charts. Sophisticated line and area graphs. Even scattergrams. All teamed with extremely useful and powerful features—exploded views, unlimited overlays, floating titles and more.



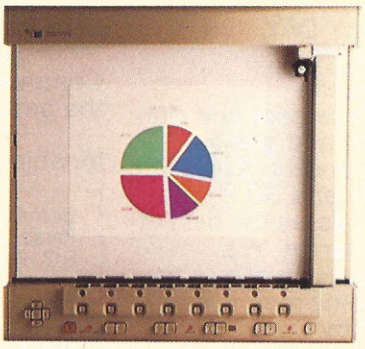


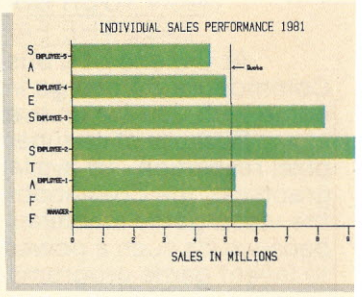




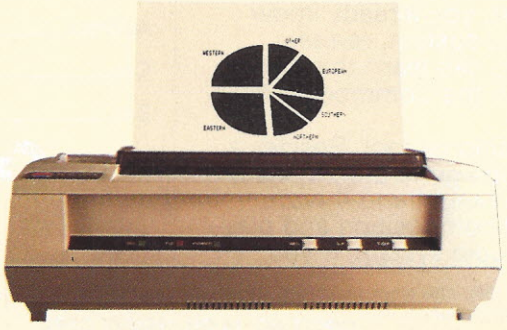
	Apple	VisiTrend/ VisiPlot	pfsGraph
Graph Types			
Line	Yes	Yes	Yes
Vertical Bar	Yes	Yes	Yes
Horizontal Bar	Yes	No	No
Side-by-side Bar	Up to 4	2	4
Pie	Yes	Yes	Yes
Partial Pie	Yes	No	No
Scattergram	Yes	Yes	No
Curve Fitting	5 Kinds	1	None
Data Points (Max.)	3500+	645	36
Plotter Compatible	Virtually Any	None	H-P7470A Only
Compatible File Types	Pascal BASIC VisiCalc	BASIC VisiCalc	pfs VisiCalc
Math Functions	Yes	Yes	No
Available Colors	6	4	4

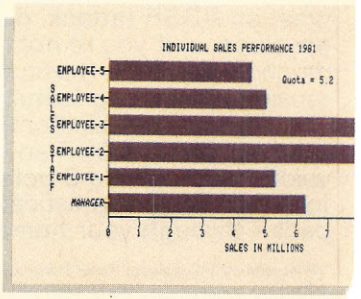
Apple Business Graphics is available for both the Apple II and Apple III.



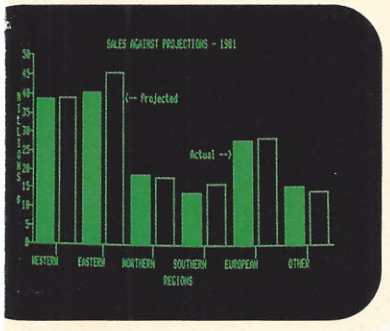


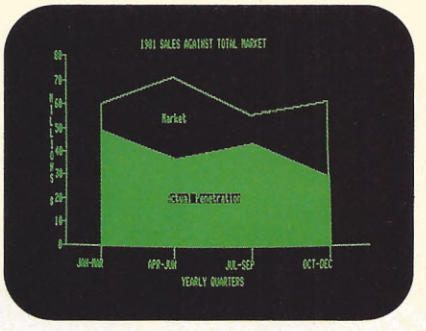
Equally important, with our graphics package you'll find more ways to see what you're doing. On the monitor of your choice. And on virtually any printer or plotter on the market.

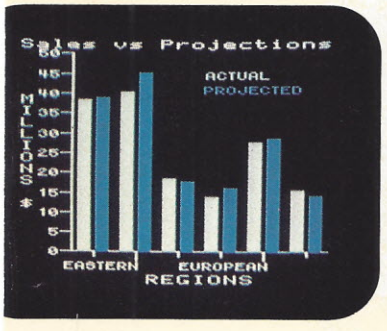


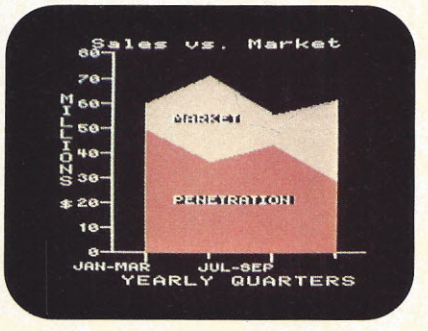


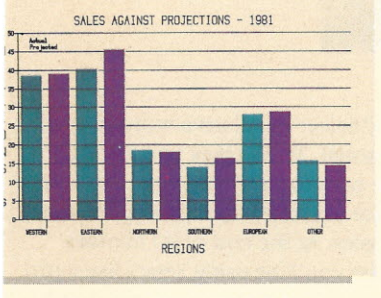
graphics are alike.
pictures to prove it.

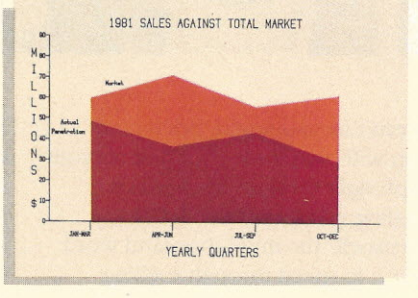


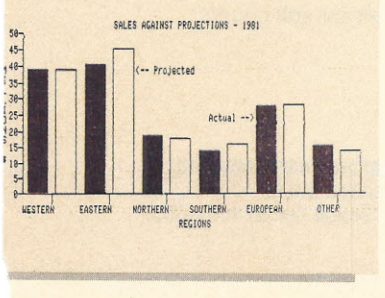


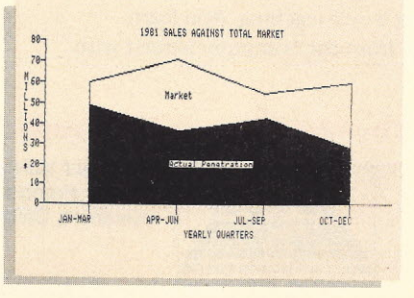












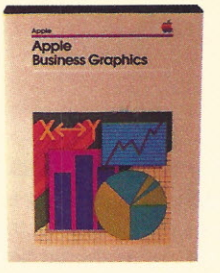
Even on transparencies and slides (by combining Apple Business Graphics with packages like Screen Director™ and Target Image Maker™).

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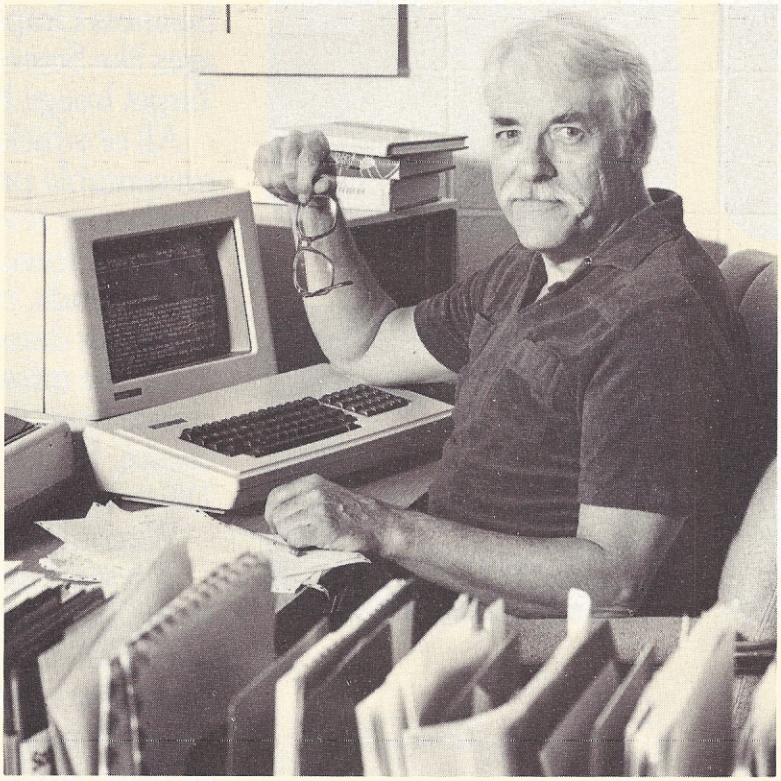
Call (800) 538-9696 for the location of the authorized Apple dealer nearest you, or for information regarding corporate purchases through our National Account Program. In California (800) 662-9238. Or write Apple Computer Inc., Advertising and Promotion Dept., 20525 Mariani Ave., Cupertino, CA 95014.

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CIRCLE NO. 6 ON INQUIRY CARD

"NO CONTEST. SELECT™ WAS EASIER TO LEARN."

(Dick Nolan, Columnist, San Francisco Examiner)



For writers, like Dick Nolan, the tough part of creating is over before words even touch paper. Getting those words on the paper should be the easy part. And that's why he chose the Select Word Processor.

Select is the easy one. The full-power, full-feature word processor without that complicated multi-key command system. You type a single key to execute each command, whether it's adding one word or making a complex block move. And easy doesn't mean limited. Select keeps up with you from your first nervous paragraph right through the headiest text juggling you'll ever do. You'll use Superspell,™ the multi-thousand word dictionary, to speed through spelling and to make corrections. Tear through mailing lists with merge print. And best of all, you'll learn Select without ever looking at the instruction manual!

Select is self-teaching. You learn directly from the computer screen with Teach,™ Select's exclusive word processing tutorial. Teach takes you through all the commands prompting you with practice exercises until you've mastered the basics. At the end of 90 minutes (or less) you'll be using Select like a pro. Select can't, of course, turn you into a writer with the panache of Dick Nolan. But it can give you clean, impeccably ordered, astonishingly handsome text.

Neatness still counts.

SELECT...The Word Processing People™

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CIRCLE NO. 74 ON INQUIRY CARD

WORD PROCESSING

by Dona Z. Meilach

Three Programs for the IBM PC

Anyone who has kept a scorecard of the microcomputer race knows that IBM (Boca Raton, FL) has nosed its way into a competitive position, despite the initial handicap imposed by limited software availability.

EasyWriter 1 was the first word processing package that the IBM Personal Computer was saddled with—and there was general agreement that it was a poor fit. IBM dove back into training and came out with a new release. Meanwhile, competitors had extra running time and quickly jumped in to perfect their own versions of word processing. The race is now running in high gear.

At this writing, three word processing programs lead the pack: WordStar appears strongly in the *win* position with the most features; Volkswriter in the *place* position because of its ease of use and low price; and EasyWriter in a tight *show* position because it bridges features of both. Others look promising but are tailing behind; we will review them in upcoming columns.

WordStar Version 3.2 (MicroPro, San Rafael, CA) operates under IBM PC DOS versions 1.0 and 1.1. Minimum requirements include 64K bytes of memory and two disk drives. (The CP/M 86 version requires 128K.) The program is written in Assembly language. The $495 price also includes manual and instruction guide.

Volkswriter Version 1.1 (Lifetree Software, Monterey, CA) requires a minimum of 64K bytes, with 128K recommended for large text entries. It is written in the Pascal language. Price is $195, including the manual.

EasyWriter 1.1 (Information Unlimited Software, Berkeley, CA) requires a minimum of 64K bytes and one disk drive. It is written in the C language. Price is $179, including the manual.

Each has its advantages

All three have good features and drawbacks when compared to one another on a tout sheet. They all support major text preparation functions: easy cursor movements, scrolling, inserting and deleting, block moves, search and replace features, with differing degrees of facility. Early versions of Volkswriter lacked some features, but the current update includes any that users requested such as indent, preserving lines and spacing, supporting underline and boldface, chaining, or merging documents.

For anyone new to computers and word processing, Volkswriter will prove the easiest and friendliest. The slim 62-page manual defies credibility for those of us nurtured on hard-to-read, obtuse instructions. The concise on-screen tutorial is among the best I've seen. I worked with someone who had never used a computer or a word processing program before. Within an hour after following the on-screen examples and referring to the documentation, she had grasped the principles. (Later she had trouble deciphering formatting and printing instructions that were not explained clearly enough anywhere. There's no utopia.)

Neither EasyWriter nor WordStar have on-screen tutorials. The 112-page EasyWriter manual is divided into three parts. *Getting Started* is the first section. Next is a five-part lesson plan that takes you through each procedure in a logical progression. It is thorough, almost painfully so, although several printed directives did not correspond with on-screen happenings. The final section is a complete reference, including directives for defining additional commands yourself. There's an appendix with a glossary and technical information.

The WordStar manual is generally considered among the most complex documentations to be found. (The pages are



numbered strangely by sections, so we didn't count them. If weight is a factor, WordStar documentation is approximately 5½ lbs., EasyWriter is 3½ lbs. and Volkswriter is 1 lb.). To overcome the problem, a cleverly-constructed flip-back, training guide is provided with WordStar, offering a short course, intermediate course and an extended course. However, because it is not geared specifically to the IBM PC, you have to interpolate which of the "F" keys are defined for what commands using a supplementary insert in the front of the manual.

Our new user was completely stymied when she began to use WordStar, even with the instruction book; after two hours, she did not get beyond lesson 4 in the short course. It is so detailed that one loses sight of the overall picture. She eased back to Volkswriter with a sigh of relief. However, after a one-hour person-to-person hands-on introduction to WordStar, she was amazed at the acrobatic like manueverability that could be accomplished with WordStar compared to Volkswriter. (She had given up on EasyWriter.) Anyone familiar with WordStar on any computer can readily tutor someone on the IBM. It's the recommended way to go to save days of frustration.

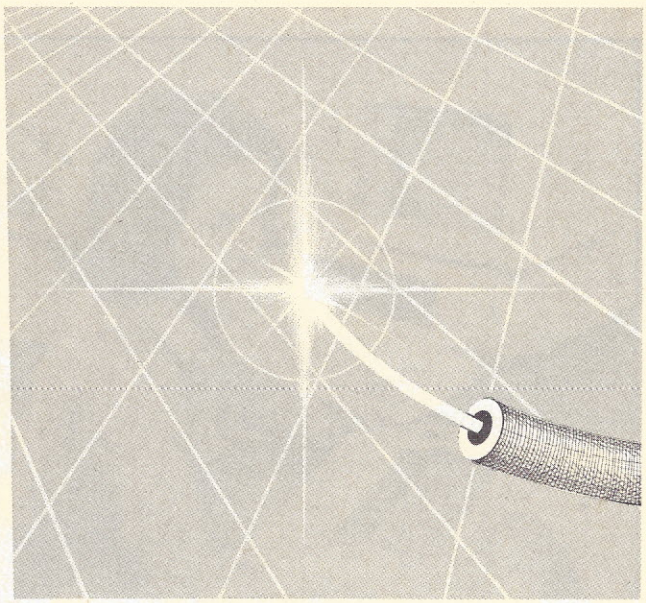
One advantage of the IBM PC is that programs written specifically for it do not require complex configurations unless you have a printer other than the IBM. Generally, within minutes after you bring the program home, insert a disk to create a working back-up disk, you can be off and running. Almost.

You cannot make a back-up copy of Volkswriter. You must fill out a registration card, send it to Lifetree Software (not your dealer) and wait for a back-up copy with the same serial number as your original. If you're impatient, you can work with the original, though it is not recommended. The time lapse is as long as it takes for the mails to get the card there, for your card and disk to be processed, and the disk to reach you. A representative estimated a minimum of five days—depending on where you live in relation to Monterey, CA.

Continued on page 166

DATA COMMUNICATIONS

by Dan W. Post



Fiber Optics: Seeing the Light

A major transformation is taking place in the communications industry—separate from the specific technologies of computers and complex circuitry. The seductive use of microprocessors has overshadowed another very significant—but more subtle—area of development. Just as the transistor revolutionized lifestyles worldwide, slender filaments—optical fibers—are going to alter the way we live. They provide solutions to age-old problems associated with wire, concentric-cable, microwave, and antenna-oriented communications systems. This technology will work hand-in-hand with computer-generated communications to improve the daily flow of information that we all depend on.

Fiber optics are immune to electromagnetic and electrostatic interference; because they offer electrical isolation from one point to another, security is greatly improved. The weight savings over conventional cables is considerable and their transmission capacity is many times greater than coaxial cables. The potential for optimized accomodation of digital data is outstanding.

Take a second and pluck a strand of hair from your scalp, then examine it. Chances are its diameter is about 50 microns or less. That single hair is at least 10 times fatter than the new monomode fiber being used in optical communications.

Such tiny conduit can accommodate computer data at the rate of 420 million bits a second over a 50-mile stretch. Costly signal repeaters aren't even needed. The tubes are so narow that only a single light ray can pass through at a time. In optical glass, the speed of light is 124,000 miles per second. The future of efficient long-distance communications lies in the use of this technology.

The marvel of light transmitted inside a tube along a curved path was commonly demonstrated as early as the 19th century and Alexander Graham Bell proposed in 1880 that speech could be transmitted via a light beam, but practical uses for the phenomenon were not recognized until the 1950s. The term fiber optics was coined by N.S. Kapany in 1956. Since the first commercial application of multimode fibers in telephone systems about five years ago, about 40,000 miles of them have been installed. An estimated sales figure of $200 million in 1982 is expected to hit over $1 billion by 1990.

Impressing intelligence upon a beam of light offers unique benefits. For example, other derivations of broadcast communication waves are sensed only indirectly, whereas light can be physically seen. Light is in considerably more rapid vibration as compared to the broadcast radio wave. Though we now know it as one of the most powerful mediums of information transfer, light was dismissed as having any significant potential in this area until the invention of the laser. (It is interesting to note that like so many terms relating to leading edge technologies, "laser" is an acronym. It stands for Light Amplification by Stimulated Emission of Radiation.)

Unfortunately, lasers are not yet available that can send data at rates that would make optimum use of the new single-mode fibers, and the strands themselves are still somewhat hard to align accurately for splicing. Ordinary multinode fibers are being used with increasing regularity, but the new state-of-the-art materials are just emerging from the research stage.

The whole field of fiber optics is actually so new that very few individuals have a comprehensive understanding of the subject. Much of the work done with these hair-like threads has been performed under the cover of military secrecy. Experiments in the private sector have been isolated by proprietary secrecy. The accompanying list includes a few important terms to provide some insight into this intriguing area of communications.

Elementary Fiber Optics Terminology

Acceptance angle: The angle within which a fiber will accept light for transmission along its core; measured from the centerline of the core

Buffer: Material for fiber covering that has no optical function

Bundle: A group of single fibers carried in a common covering

Cable: A single fiber or a bundle, including strengthening strands of material, covered by a protective jacket

Characteristic angle: The angle at which a light ray propagates along the core

Cladding: A material that has a lower index of refraction than the light-carrying fiber and that sheathes the fiber core

Core: The light-carrying material of a fiber, with a higher index of refraction than the cladding

Coupling or coupler: A device for connecting one fiber with another

Cross talk: A leakage of communication energy from one conductor to another

Dispersion: The spreading of a light pulse as it traverses a fiber scattering of rays

Fiber: The optical waveguide, or light-carrying core or conductor. It may be made of glass or other materials not generally referred to as fibrous

Index of refraction: Ratio comparing the velocity of light in a vacuum to the velocity of light in the medium

Multimode fiber: A fiver propagating in more than one mode at a given wavelength

Numerical aperture: The degree of light acceptance of an optical fiber

Scan: To prepare data serially for transmission

Single-mode fiber: A fiber propagating in one mode

Waveguide dispersion: Spreadings of a light pulse caused by differences in the dimensions along the length of a fiber

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PORTABLES

by Dan W. Post and Bob McElwain

The Briefcase Computer

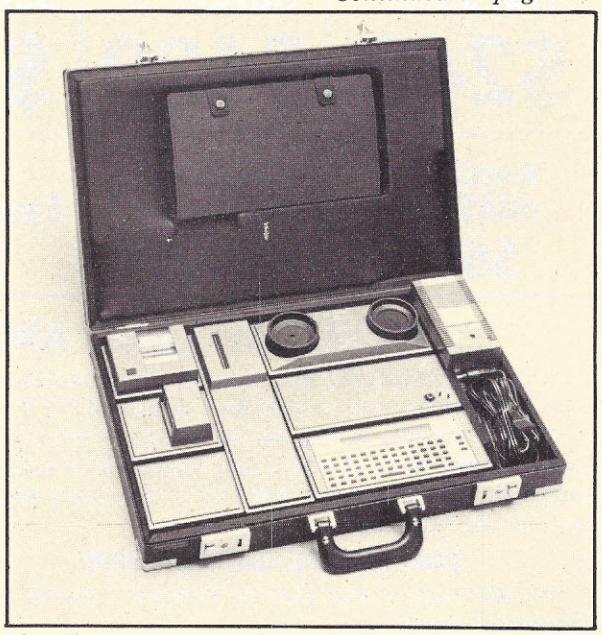
While the Osborne, Kaypro, Extec, Courier and other portable computers have molded cases to fit around the components, there is a recent trend among start-up manufacturers to reduce bulk and house the electronics in slim plastic briefcases. Representative of this new generation are offerings from CompuCase (Atlanta, GA) and Olympia (Somerville, NJ). The similarities end with the aesthetics, however. One system emphasizes mass storage potential, the other communications facilities.

Enclosed in a standard-sized, comparatively nondescript attache case, the CompuCase microcomputer has 64K bytes of RAM, an 8M-byte floppy disk drive, a 40-by-12 line plasma display screen, a 128-character ASCII keyboard, an 80-column dot matrix impact printer, and an RS-232 communications interface. Dual 8085 microprocessors are built into a standard 13-in. by 18-in. by 15.5-in. case that weighs less than 25 pounds. It uses the CP/M operating system.

The manufacturer claims that the system is intended primarily for stand-alone processing at remote field locations, but the absence of a bell-compatible modem for basic communications may be a deterrent to some potential users—especially since the CompuCase wields a $7,500-$10,000 price tag, which positions it right alongside the elegant Grid Navigator system ("Portables" *IA* Sept 82).

The Olympia Portable Computer carries a 6502 microprocessor with a 65-character keyboard, a liquid crystal display panel and an internal battery pack. Weighing about 21 ounces, it supports 52K bytes of RAM, plus 64K bytes of ROM. The computer and peripheral units are engineered to fit in a attache case. Unlike the CompuCase, it can be connected to other systems by using the optional acoustic modem or RS-232C interface. Though it lacks a built-in display, output can be directed to a TV or video monitor, to letter-quality printers, or to a four color plotter. It comes standard with a 4K programmable memory and the follow-

Continued on page 170



The Olympia portable computer

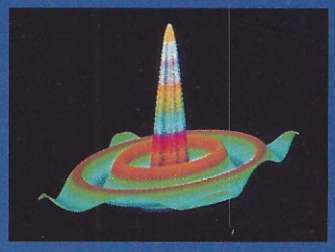
The CompuCase

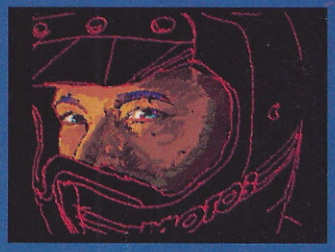
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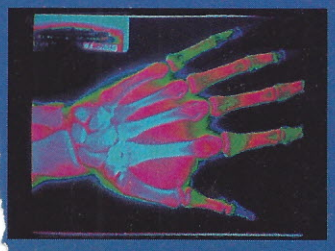


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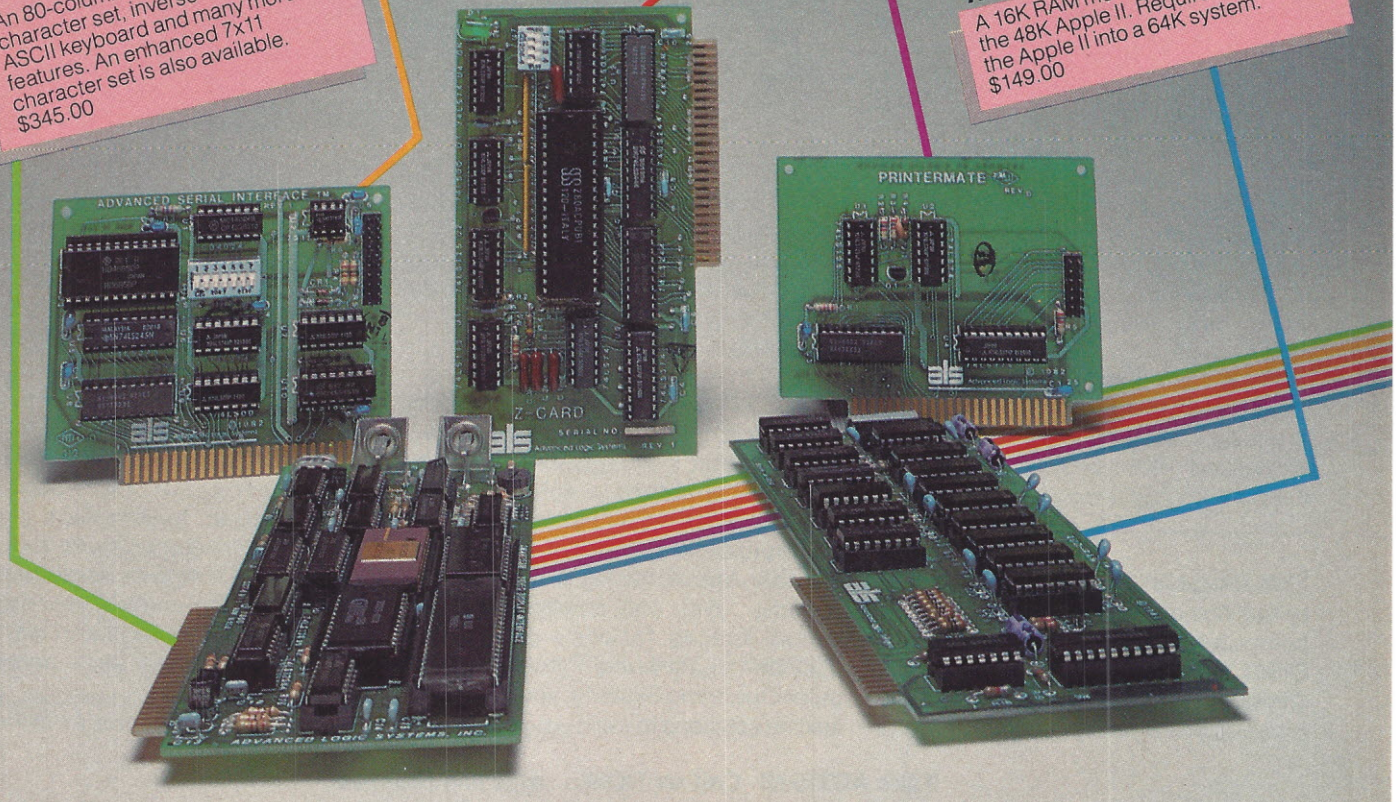
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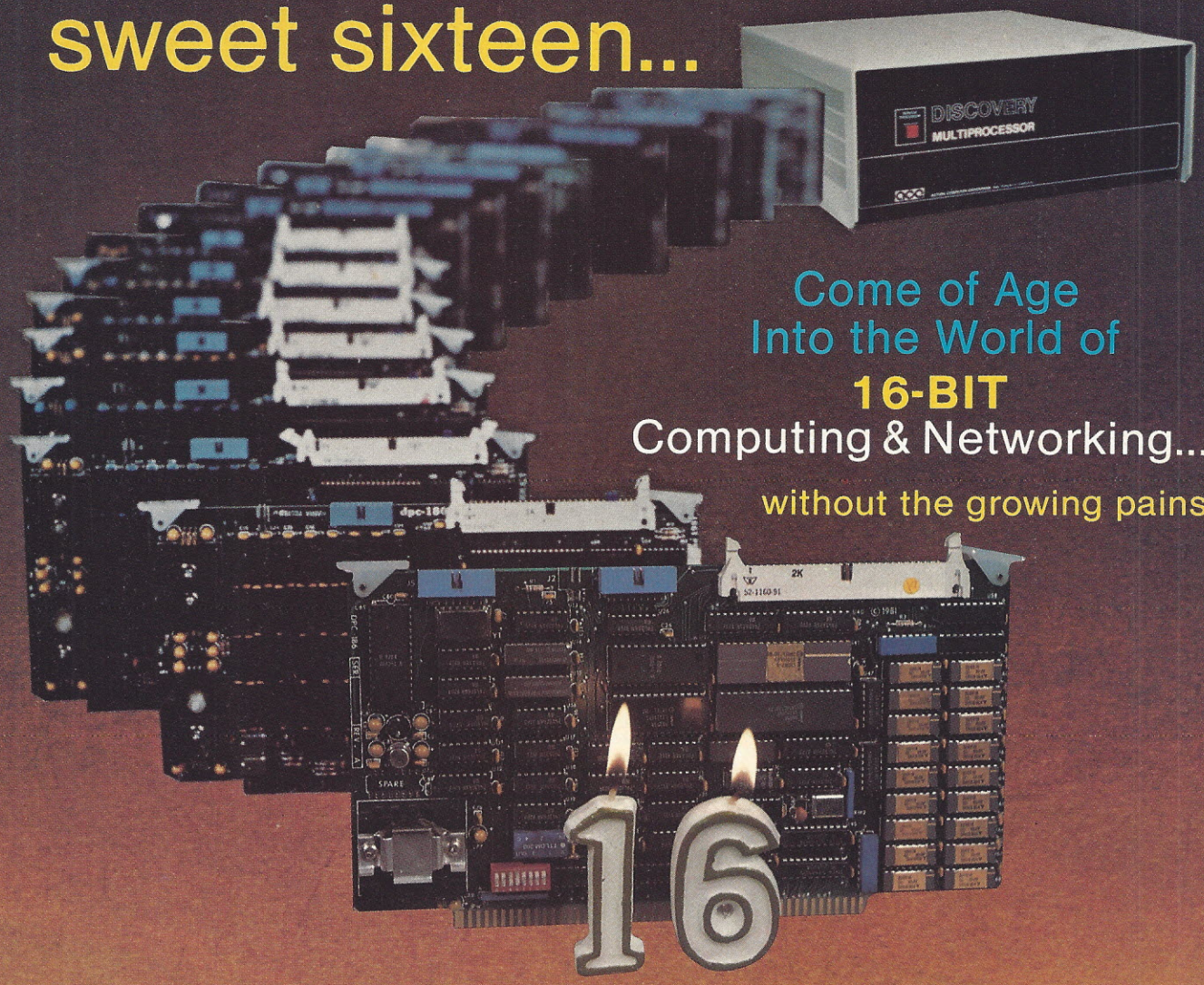


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CIRCLE NO. 1 ON INQUIRY CARD

by David D. Busch

Learning to Use the Basic Language

How does $30 for a complete computer system sound? Though my Pre-Basic computer does not have many niceties of even the simplest personal microcomputer—or even most programmable pocket calculators —it does serve as an inexpensive, and fairly sophisticated way of demonstrating how Basic programming works to new users. The secret is substituting one human being, an audio tape recorder, and a calculator for the expensive hardware.

Here's how the system works: Pre-Basic programs are "saved" to tape in the form of audio messages recorded with an ordinary cassette recorder and microphone. The only requirement is that the recorder have a built-in index counter.

When a Pre-Basic program is run, the user begins listening to the tape, and following instructions. Just like a microcomputer, the instructions are followed sequentially as they are recorded on the tape—until an IF-THEN or other branching instruction tells the listener to advance to a different index mark on the tape if certain conditions are met. By judicious use of these index marks, a Pre-Basic programmer can send control from one end of the program (tape) to the other, accessing subroutines at will. However, for clarity and speed (just like in a real Basic program), I have adhered to a rigid top-to-bottom program flow in the accompanying sample program. Obviously, the less advancing and rewinding of the tape program, the more rapidly the program will run.

A worksheet is kept that stores all the values of the variables used in the program. When the program is first run, the worksheet is blank; again, just like a conventional computer program with variables initialized to null values. At various points in the program, the operator is asked to either input values and write them to the correct variable, or to take values from variables, perform certain calculations with them, and then store the results in the same—or a new—variable location.

The worksheet provided with the program functions much like the variable table in computer memory. In Pre-Basic, the table is arranged in alphabetical order, because that is the way the "human" CPU can most easily scan to find a desired variable name. In an actual computer, the variable table is ordered in the way the variables were first enountered, and the computer looks from top to bottom each time a value is needed. Of course, a human being can use this table somewhat differently than a computer. If a variable starts with a Z, a human will know to start looking at the bottom of the table. If a frequently-used variable is called two program lines in a row, a human may remember the value from the last calculation—a computer must look up the figure anew each time the variable is used.

The mechanics of using Pre-Basic are these: after writing and debugging the program on paper, the programmer records the instructions onto an audio tape. Each instruction should be recorded at the point in the tape corresponding to the index mark/line number. Line 10 should be recorded at index 10, line 20 at index 20, etc. Some compensation may be made for recorders that may "eat up" 10 index numbers in only a few seconds. It should also be noted that a program recorded on a given tape recorder cannot be run on a recorder whose index marks do not correspond. I recommend reading each line fairly slowly, and repeating each line once. When some calculation must be carried out, the programmer says the word "pause" to instruct the operator to turn off the tape recorder while carrying out the function. After the calculation has been performed and the result stored in the variable named in the instruction, the tape recorder is turned back on and the next program line listened to.

Sometimes the values of variables will change. The operator should cross out the previous value, and write the new total next to it on the worksheet. Some figures must be supplied from information the operator personally has on hand. These correspond to normal input statements in conventional programs.

To illustrate Pre-Basic, the accompanying sample program, Autocost, is presented in both Pre-Basic and Basic versions for comparison. While line numbers for the two versions don't correspond exactly, they are close enough to compare what is going on in each type of program. Only a brief commentary about the Basic version is necessary. Though written for the TRS-80 Model I, it will run on nearly any Basic interpreter.

In Autocost (Basic), the operator inputs various information about a given automobile, such as whether it was leased or purchased, how many months owned, price paid, and cost of tires, repairs or maintenance. Miles driven and the car's MPG are used, along with estimates of number of miles driven during given gas-cost time spans. These figures allow the program to calculate an approximate cost per mile for driving the automobile. It's a simple program, and one that translated fairly easily into Pre-Basic.

Autocost (Pre-Basic) begins with some short audible instructions that remind the operator about writing variables down on the worksheet, and pausing when instructed to by the program.

The body of the program begins at line 10. The first instruction the operator hears is to write at variable A a numeral one if the car is leased, and a two if the car is purchased. After the pause, the instructions ask the operator to look at variable A. If it equals one (that is, the car is leased), the tape recorder should be advanced to index mark 50. If the car is purchased, the instructions between 50 and 90 are to be skipped, and the recorder goes directly to index 90.

Between lines 50 and 90, the program asks for the amount of the monthly lease payments, and the length the lease has run. The lease charge times the run-to-date equals the total amount paid by the operator to date. Control is then directed to index 140 (line 140). If the car is purchased, the program instead asks for the purchase price, present value and subtracts to determine depreciation cost. This value roughly corresponds to the lease price paid and is stored in the same variable, PAID. Both leased and purchased car owners are next asked, in line 140, to store the mileage of the car, when obtained, in variable START, then the current mileage is entered in variable ODOM. Subtraction directed in Line 160 provides the total miles driven, to be written next to variable MILES.

Other data are input, and calculations performed. The operator is given the chance to estimate how many of the miles driven in the car were accumulated in a given year (enter zero if the car was obtained after the relevant year), and a rough estimate of the gasoline cost in those years calculated. I used an average gas cost of $.55 per gallon in 1976, $.65 in 1977, $.75 in 1978, $.90 in 1979 and $1.25 in 1980. These correspond to actual costs in the Midwest. You may want to change the figures for your area of the country. You may want to add to the program to account for the latest data.

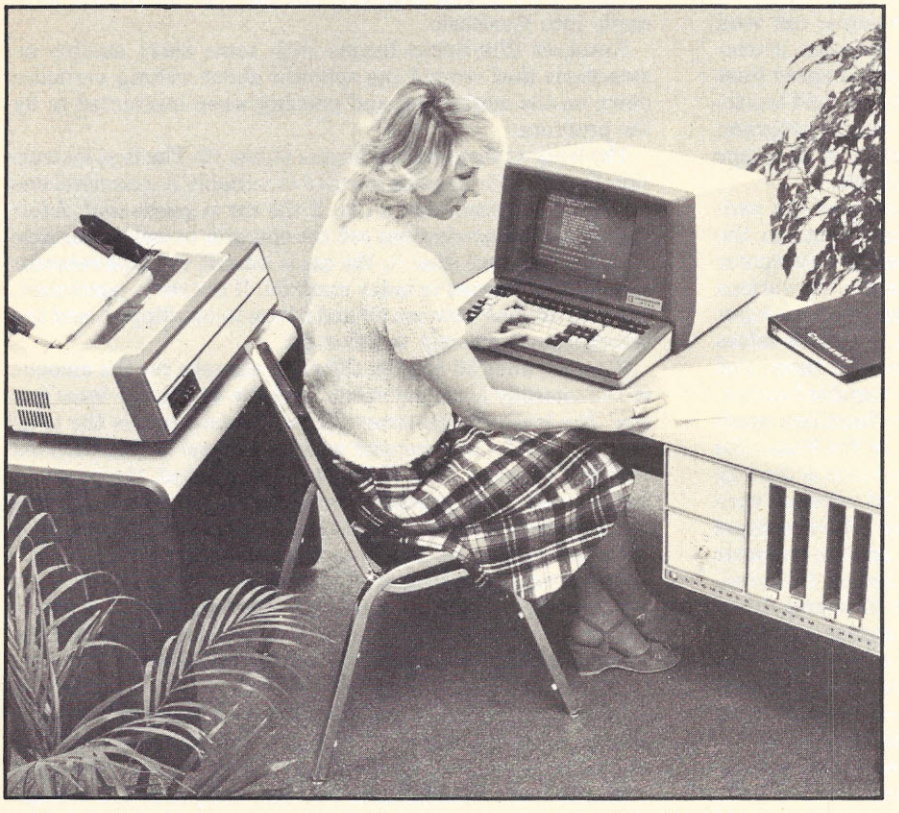
There is not a lot of explanation required for much of the program; it's adapted from one of the first I wrote in my initial week of programming a 4K Level I TRS-80 in 1978. I used variable names that were compatible with Radio Shack's Level II Basic. That is, no keywords were contained, and only the first two characters of the variable were significant. If a program is not going to be translated from Pre-Basic to a Basic

Continued on page 200

Are You Ready For a Database Management System?

by Michael K. Kan, M.D.

A database management system can provide a myriad of useful business applications.



A widespread computer application is organizing and storing data for convenient retrieval in a database. In business, they may take the form of mailing lists, personnel records, inventory, customer lists or purchasing records. In the professions, databases may include client information, appointment list, journal references and records of professional education.

Essentially a database is a collection of related information stored together to serve one or more applications. It should be convenient to use and the physical storage of the data should be transparent to the users. There should be provisions to modify structure without re-entering the data.

Surveying a sample program

Many database management systems (DBMS) are available for various computers. The program that I will describe in order to illustrate the typical uses of a DBMS is supplied by Cromemco, Inc. (Mountain View, CA). It runs in a Cromemco computer with 65K bytes of RAM and dual 8-in. floppy disk drives.

This particular package consists of two separate programs. The first is a menu-driven DBMS, which is self-contained and can be used alone without the Database Reporter. The DBR program enhances the overall performance of the DBMS package by providing an easy way to print reports with specific format requirements from the database.

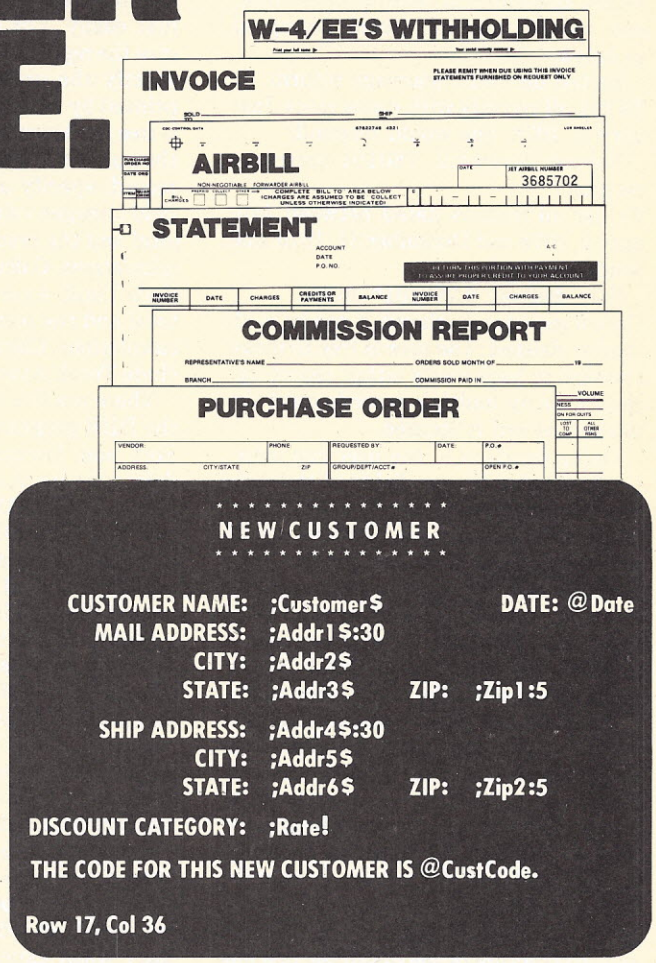
The DBMS program uses a multi-keyed indexed sequential access method for organization. It is implemented in a structured Basic language. To enter the program system, one simply types "RUN DBMS" and the main menu will be displayed. Nine numbered functions are provided for the creation of a database, entering, reviewing or editing data records and for printing mailing labels. The disk directories can also be listed from the main menu without leaving the DBMS.

Creation of a database is convenient; the user only has to supply a name to the master and data files and define the data fields by name and subsequently assigning the field widths and field types. Two data types are supported, namely alphanumeric (A) or numeric (N). Sort files can also be defined. Each sort may include as many fields as can be included with a total length of 123 characters. A maximum of 20 sorts can be included in each database. After creating a new database, the structure can be displayed for verification.

After structure has been defined, new data can be entered. The user will be prompted, one field at a time, when entering data. The expected field length is indicated by a vertical bar at the end of each data field to serve as visual guide during data entry. If material entering exceeds predefined field width, an error message will be displayed and the user will be prompted for re-entry. The DBMS only right-justifies a numerical field, but will not check against nonnumerical data.

Records in a data file can be changed, deleted or displayed with function 5. The sequence of records to be displayed is

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CIRCLE NO. 105 ON INQUIRY CARD

determined by a sort number. Suppose we have a database with a sort (sort 2) ordered by a 6-digit date field (yymmdd). To list all records in chronological order, one would respond when prompted as below:

Sorted desired:2 (carriage return)

To list all records with dates since January 1, 1978, one would respond:

Sorted desired:2, 780101 (carriage return)

To list all records dated between January 1, 1978 and December 31, 1979, one would respond:

Sort desired: 2,780101*791231

Once a record is displayed, it can be modified or deleted. The user is free to move forward or backwards either record-by-record, or by multiple records until the desired record is located.

Using function 6, the user can selectively display chosen fields of the data records by using rejection criteria to exclude irrevelant records. Chosen records are selected based on one or more data fields, relational operators (<,>,=<>,>=) and the value to be used as a basis of rejection. If a hard copy of the output is desired, one would press Ctrl-P on the keyboard to select the printer echo mode.

Function 7 is used to add or change a sort or modify the names of various data fields in the master file. This function is relatively restricted because the field width of any data field cannot be altered. The sequence of the data fields cannot be changed and data fields cannot be added or deleted. In order to actually modify an existing database with changes in the structure of the database, one has to use the DBR program.

Benefits of report generator

A flexible report generator allows the user to define a report with a specific format easily. For example, the user can give the report a title or column headings, specify the order that records will be printed by sorting the records. The user is free to choose the column width, specify the number of lines to skip between each record, specify a break when a certain field changes values, then print the subtotal and the results of several numeral calculations. Calculations on the DBR include Total, Average, Count or Percent. total and the results of several numeral calculations. Calculations on the DBR include Total, Average, Count or Percent.

There are five essential commands in the DBR program: Input, Output, Find, Sort and Format. Input and Output define the input and output files. Input files can be a DBMS data file or an ordinary file. The DBR sort function, for example, can be applied to sort an ordinary file instead of sorting a database. The output file can also be an ordinary file or a DBMS file. When the DBR is used to create a new database, the output file should be a DBMS file. By using the DBR to read the existing files and directing the output to a new DBMS, the structure of a database can be altered with incorporation of new data fields or deletion of unused data fields. This capacity is extremely important for a user because he does not have to design correct structure right from the beginning. The database can be expanded or contracted as necessary when experience is built up after some usage.

The DBR Find command is very useful to select a subset of data records. A typical command would be:

Find Composer="Beethoven" and Performer="Rubinstein" End

This command would locate all records in a music database composed by Beethoven and performed by Rubinstein.

The DBR programs are easy to write and typically much shorter than the size of an equivalent Basic program. DBR programs are much easier to understand and to maintain compared to Basic programs. DBR language can be learned in several hours by a person with good programming background. It is also easier to learn compared to Basic for someone without programming background.

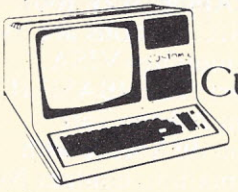
On-site example

I work in a diagnostic isotople laboratory and keep a database on patients with unusual scan findings. The database has enabled closer follow-up of the patients by correlating with surgical or biopsy findings at periodical intervals. New data is incorporated as it becomes available. As time goes on, a teaching file of unusual cases has been built and this has been very helpful as a source of reference when unusual cases are encountered.

A central database for professional continual education for laboratory personnel is also maintained. Periodically, the accumulated list of courses or conferences attended by each person is printed as permanent records. Records of such education are required by various licens-

Continued on page 194

SOFTWARE COMPATIBLE MACHINES
CP/M and TRSDOS

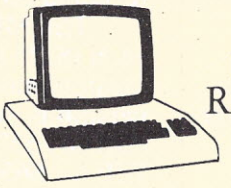


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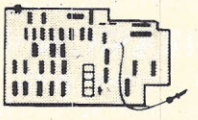
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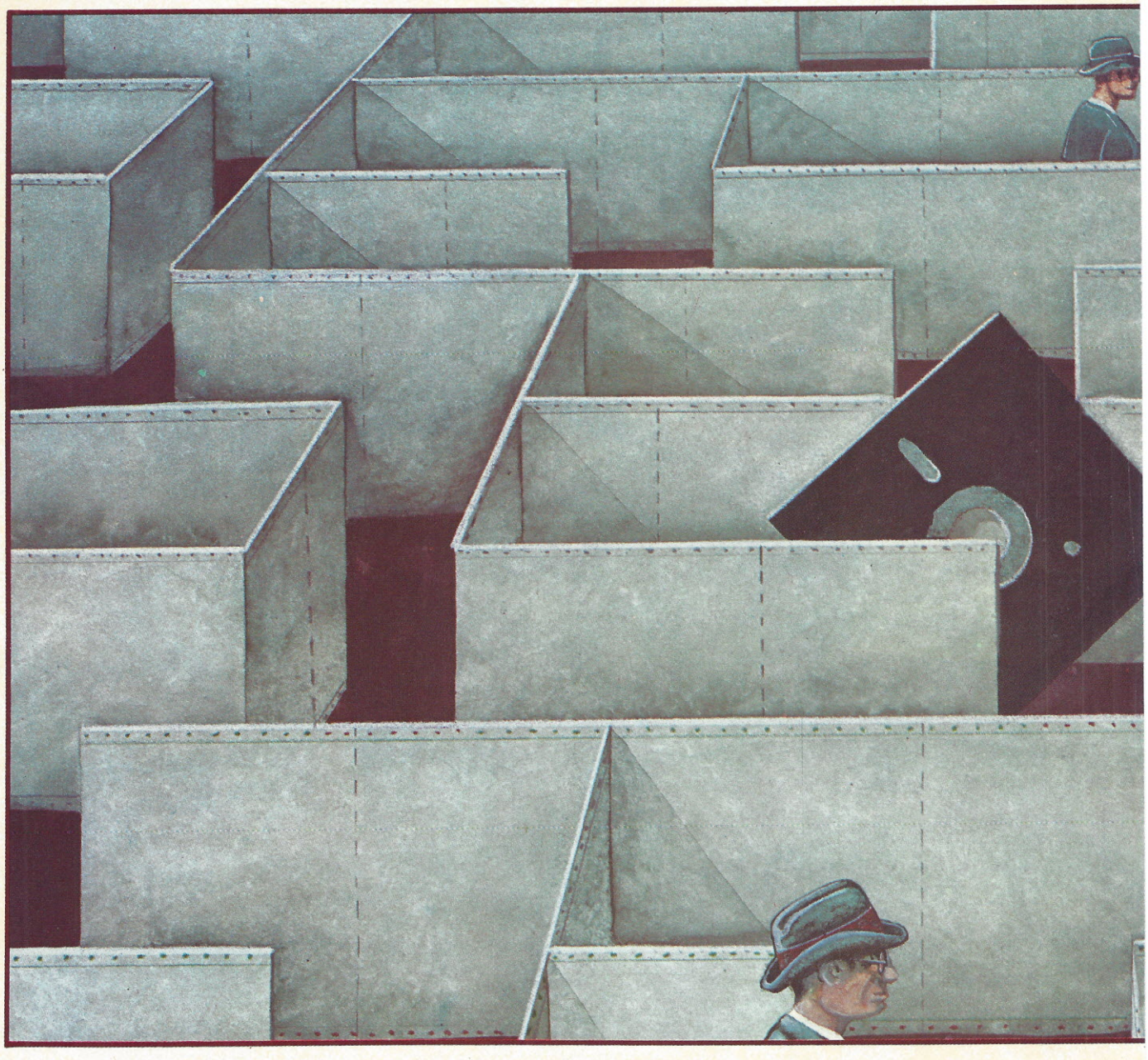
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Buyer's Guide to Word Processing Software

by Carl Heintz, C.P.A.

In no area, has the electronic revolution been more apparent than in the translation of thoughts into printed words. The presence of word processing is almost universal throughout every facet of business and industry, education and science.

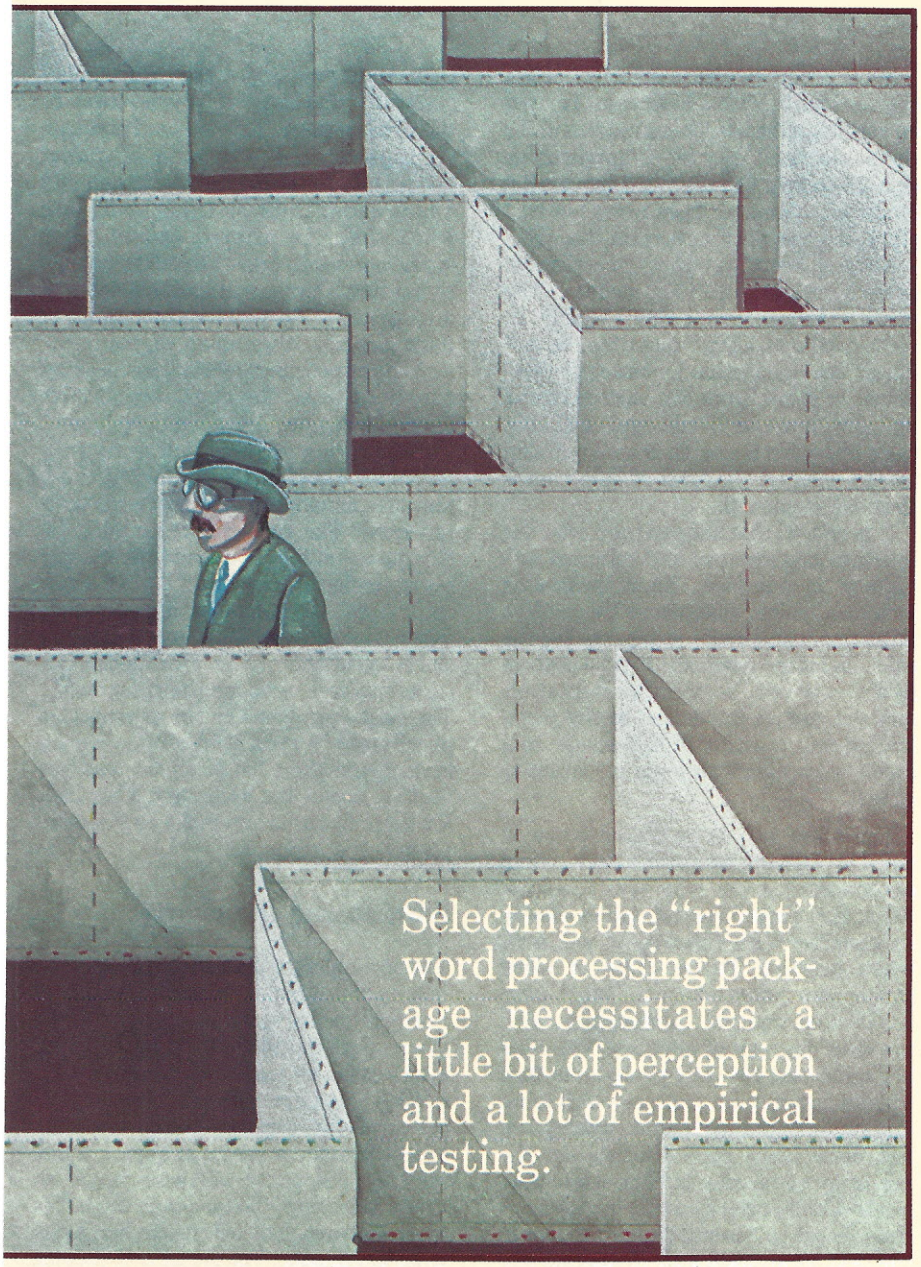
Unlike many computer applications, word processing is easily implemented. In many cases, it consists of the logical extension of the technology that immediately preceded it—the typewriter. It is almost prophetic that one of the major developments of the nineteenth century's industrial revolution, the typewriting machine, is one of the first fatalities of the electronic revolution.

The choice of a word processor is not a straightforward matter. There are hundreds of word processing programs and systems available. Choosing the most effective one for your application can be a frustrating and challenging task.

To integrate or not to integrate?

The first decision that must be made is whether or not to purchase an integrated word processor (hardware and software from one vendor) or to go the route of a general-purpose microcomputer fitted with the word processing program of choice. There are advantages and disadvantages to both.

The integrated word processing pack-



age, such as one that would be obtained from IBM, Wang, Lanier or NBI offer some definite advantages to the user concerned exclusively with word processing. Specially-designed hardware and integrated software take advantage of hardware features such as full page screens, special function keys, proprietary printer drivers and operating system quirks. Easier initialization and set-up, plus simplified trouble-shooting and all-around support from one vendor are generally offered. Also, the design of such systems is targeted at the office worker as a primary user.

On the other hand, the purchase of an integrated system can present some disadvantages. A user may become dependent upon one vendor for software and hardware support, the machine has little adaptability to other uses, and there is usually limited availability of other peripherals.

The choice of a general-purpose microcomputer, with a word processing program from another vendor is generally the most cost-effective choice. Using it as the company accounting machine, inventory management tool, planning and forecasting instrument and engineering aid allows one piece of hardware to satisfy a multitude of needs in the most cost-effective manner. Further, a multipurpose microcomputer will have a greater degree of compatibility with a wide variety of peripherals than the average stand-alone word processing unit. It is more expandable and upgradable. Significantly, the micro and software can usually be purchased for considerably less than the dedicated word processor. As confusing as it may be, the choice of hardware is definitely not the most critical factor in the success of a word processing application for the microcomputer. Software is the key to meeting user needs and providing a satisfactory relationship between operator and machine. Unlike accounting applications, which tend to be sporatic and transient in use, the average word processor is used continuously in an installation. Consider, for example, a law office, where the paperwork often centers around the word processor. In an industrial company, it can be the center of the proposal-and-bidding process.

Though it may be an over-simplification, choosing a good piece of hardware is rather straightforward. Compare the statistics and choose the unit that offers the best price/performance ratio. Choosing software involves a more subtle and indefinite decision process. There are few, if any, definitive decision rules.

There are of course, some objective criteria that can be used to evaluate the suitability of a word processing program, but the most important aspect of any system is really an intangible factor inherent in the intrinsic design of the system. Individual designers think along different paths, and accordingly, they choose different conventions and logical constructions to their programs. It is these differences in approach and execution that differentiate a lousy word processing program from a brilliant one.

Lest a program be judged too hastily upon initial "feel" alone, it is important to note that all programs contain a number of separate conventions. The more powerful a program, the greater the number of rules, and most probably, the more time it will take to become entirely comfortable with it. Take for example, WordStar, one of the more powerful programs on the market. Many have used the program for years without ever fully understanding a majority of the commands and options available. Even with such a complex program, one has to become familiar and comfortable with the way in which the program interacts with the user. One shouldn't be too hasty in dismissing a program as too difficult—just because you haven't learned the proper syntax, or aren't comfortable with it.

It used to be that essentially all a word processor had to do was process text. Now, on the horizon, there are a whole new generation of products that will include graphics capabilities and mathematical capabilities as an integral part of the packages. These products are just beginning to become available, but they promise to be exciting. Imagine combining the tasks of color graphics generation, multiple fonts, spreadsheet modeling and traditional word processing together.

Criteria for choosing a package

In the meantime, how should a user go about selecting the right word processing package for his application? The task is one that necessitates a little bit of perception and a lot of empirical testing. Word processors tend to be relatively inexpensive programs, and every adventurous computer owner should, as part of a general education, purchase two or more just for the learning experience. Most programs are relatively easy to get into on an elementary level. The true test of a program occurs only after the user attempts to perform other than the trivial tasks with it. The differences between programs are generally perceived when the user attempts to push the program to its limits—especially in the area of sophisticated print routines, special printing features, editing aids and file management.

While little is learned about a program while typing in raw text, its true colors quickly become evident when a sophisticated layout is attempted. Try a financial statement or a multi-columned text with some changes in borders. use "boilerplate" language, or append from one file to the next. It doesn't take long to determine whether you will be praising or damning the program in the years to come with these kinds of challenges. A trained salesperson can occasionally be of substantial benefit in such an undertaking. He should be more familiar with the syntactical quirks of the system. If the salesperson can't create sophisticated output from the system, don't necessarily write it off. Many who sell computers are circumstantially undertrained and undermotivated.

The first clue to the inherent professionalism of a word processor is the documentation. The best manuals contain at least two parts: a tutorial that leads the new user through the maze of commands and syntax, and a reference section that is indexed and oriented to help the somewhat experienced user accomplish advanced word processing feats. The index is probably the most important component of the reference section. It's no good to have a comprehensive manual unless you have a means of finding what you want when you want to find it. The more redundant an index is, the better. While I may refer to changing the margin as "setting margin tabs" someone else may seek that same information under "right margin" or "line size" or "page size." The index should provide the means by which users can address their needs in the documentation easily.

Some products offer a quick reference chart, which is often a basic chart printed on cardboard stock. These are useful for the novice, and may be comprehensive enough to help the regular user recall a forgotten command. They won't take the place of good documentation, though.

Almost every product incorporates some derivation of "help menus." The quality of these menus varies widely. In some products, such a menu can be sufficient documentation for the entire program. In other products, they may end up being more of an annoyance than a helpful feature. Some, such as WordStar, let the user set the level of help menus that are displayed.

It is critical that the program offer the operator convenience and minimal ambiguity in function. Some programs include a "ruler" that shows the relative position of the cursor—somewhat like the ruler indicated naturally by the platten in a typewriter. Some other important features are an indication of the page/line/column position of the cursor, and those that allow automatic centering of text.

There are two basic philosophies in word processing programs. One school contends that the way text looks on the screen should correspond as closely as possible with the way it will look when printed. These kinds of word processors adhere to the "what-you-see-is-what-you-get" philosophy, with varying degrees of success. The idea is a good one; the only problem is that special commands, such as boldfacing and underlining or double striking are not effectively reproducable on the majority of terminals. The what-you-see-is-what-you-get word processors thus resort to "control keys" shown in the text as an indicator of special features selected. For example, in WordStar, the presence of a command beginning bold print is shown on the screen as "^B". Of course, these codes mess up the appearance of the text to some degree. One of the other failings of this type of systems is their inability to depict changes in character pitch and in some cases, line spacing changes. The disadvantages are—in the minds of many regular users—greatly outweighed by the advantages of being able to see, in rough form at least, what the text will look like when it is finally printed out.

The other extreme of the word processing world holds that since the terminal and the printer will never look identical, forget the whole thing. In these word processors, the CRT display generally has little if any relation to the printed page. This method is disadvantageous in the opinion of many, because it fails to give the user even a hint about the way things will look when they are printed out. As any typist can verify, it is helpful to be able to see how things will look before producing hard copy. The placement of page breaks, alignment of columns, and the appearance of margins is often enhanced when the operator can preview the result.

The printing features that word processors have are largely similar. After all, just how much can you do with the written word? The answer is quite a bit, including the ability to change the spacing between characters within a word (character pitch), the number of lines-per-inch, super- and sub-scripting, even changing the color of the ribbon. But as the features increase, so does the complexity. The best approach for the prospective purchaser of a word processing program is simple: make a list of all the features that are useful and necessary. Then look for those features and make as few compromises as possible.

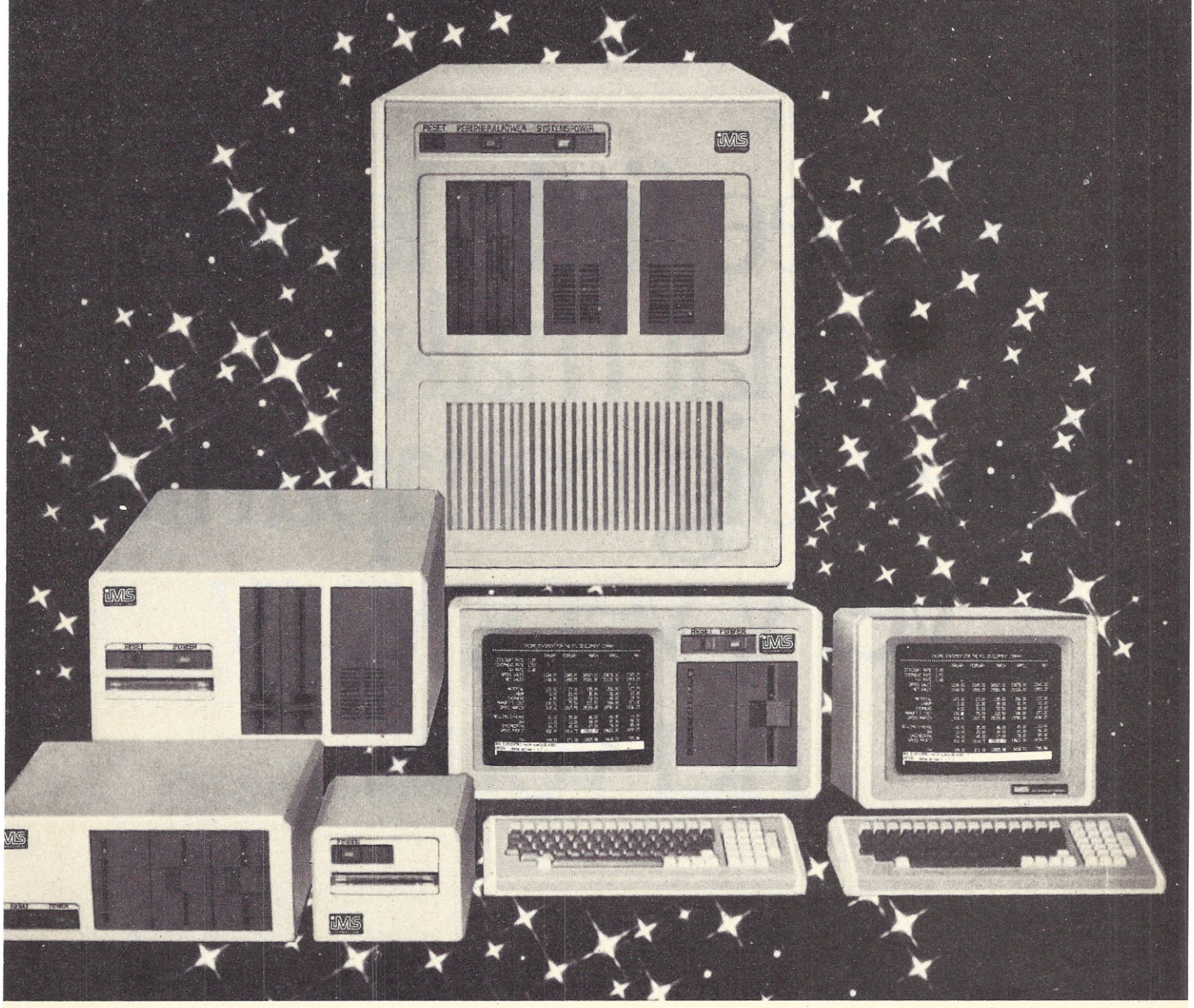
How to use the charts

The accompanying charts represent the results of polling a wide cross-section of word processing software vendors. While every effort was made to gather accurate information, we did not test each system, relying soley upon the responses we received from the manufacturers. The charts provide a useful shopping guide for the prospective software buyer to begin selecting the package with the most features that will prove beneficial to his application. The intent is to provide a comprehensive sampling of products—not a listing of every offering on the market. Products not featured here will be included in future updates to this series. □

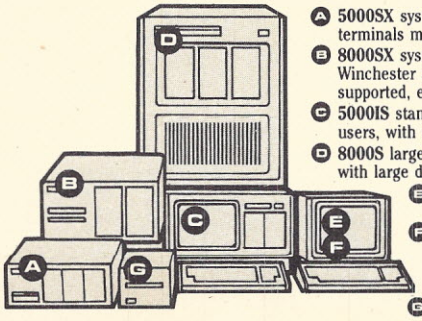
Contributing editor Carl Heintz has spoken on microcomputers before discussion groups of the California Society of CPAs. He has taught accounting at both USC and UCLA and received undergraduate and graduate degrees in business administration from the former. He has made numerous presentations on business topics before civic and business groups, including a series to the American Management Associations. In addition to many articles, Mr. Heintz has two books to his credit. Charts follow

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Feature	Interactive Systems Technology IST-86	IBM S/34	Burroughs B20	Digital Equipment Corporation DEC 11/44
16-bit processor	Std.	Std.	Std.	Std.
Multi-user	Std.	Opt.	No	Std.
Multi-programming	Std.	Opt.	No	Std.
Hard disk	10MB Std.	8.6MB Std.	8MB Std.	20MB Std.
Tape backup	Std.	No	Opt.	Opt.
Floppy disk	No	Std.	Std.	Opt.
Standard memory	128KB	32KB	256KB	256KB
Maximum memory	1024KB	256KB	1024KB	1024KB
Single desk top unit	Std.	No	No	No
Memory Speed	300ns	600ns	Unkn.	480ns
Memory ECC	Std.	No	No	Std.
15" screen	Std.	No	Std.	No
Cost	$12,995	$18,465	$20,460	$46,000
Extra cost items	lang.	os, lang.	lang, opts.	lang, opts.
Price of each system configured to 128KB RAM, 6 serial ports, 4 user terminals, 10MB hard disk, tape backup:	$14,495	$33,205[1]	$32,750[2]	$54,000[3]

[1] 8.6MB disk drive, no tape, floppy backup
[2] 8MB disk drive, no tape, floppy backup, network configuration, 256KB RAM
[3] 20MB disk drive, no tape, disk pack backup, 256KB RAM



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Special Report
Continued from page 42

Guide to Numbered Column Headings on Charts

1. *Tutorial.* The documentation provided by a system is critical to the effective use of the programs. A tutorial section of the documentation should include a step-by-step introduction to the use of the program. Often tutorials are very narrative in nature and lead the user through sample sessions with the program
2. *Reference.* The standard reference for a word processing program is much like a dictionary—a definition and description of each command, usually organized alphabetically. It is helpful only if indexed in some intelligent fashion.
3. *Help Menus.* A help menu is integrated into the program and consists of documentation in the form of descriptions on the screens that help the user choose the correct command. Help menus can range from simple descriptions of command protocols with their meaning (such as "^A=left word") to complete pages of text that appear if requested. (Many times the "^?" command is used for something like this.
4. *Quick Reference Chart.* A small (usually 8½-by-11-in.) folded card contains an abbreviated description of major commands.
5. *Index.* Index arrangements can range from a very simple subject index to a complex multi-access index with superb cross referencing. Often overlooked, the presence of a good index can be major part of a good documentation package.
6. *Ruler.* Some systems, particularly the "you-get-what-you-see" variety, have an indication at the top of the page that indicates relative page position, and oftentimes the position of tab settings. The ruler display can be useful for manually centering or positioning text in a particular position.
7. *Auto Center.* The ability to center headlines, titles and text with the use of a simple command is often useful.
8. *Block operations to file under Edit.* To be effectively used in a production environment, the word processor must be able to allow text to be appended to the file under edit from other files (on disk). It is also helpful to allow the user to insert text from another file (out on the disk) into the body of the text. Finally, it is often important to allow the user to write blocks of copy out to different files.
9. *Operations to File on Disk.* Some systems allow the user to append text from the file under edit to other files that are not being edited. In other words, when editing file A, one can write out text and append it to file B, which is on the disk. In the most sophisticated systems, the user can append it to a specific place or position in the other file. These features are particularly sophisticated and not useful for the majority of users.
10. *Position Display.* A status line that may appear at the top of the screen tells the user the relative position of the cursor—the page, line and column upon which it rests. It is useful for computing the amount of space left in a page, moving the cursor to a specific place in the file and as a count of the amount of material in a file.
11. *Cursor Address By Page/Line.* Some systems allow the user to position the cursor at a particular page and line by directly addressing that location. In the editing of large text files, it is often easier to make corrections when the operator can jump to a specific page and line.
12. *Disk Buffering.* The amount of memory that any particular hardware system has is finite and easily exceedable by a reasonably large text file. Sophisticated systems circumvent the problems caused by memory shortages by automatically filing portions of the text onto a working file on disk. In other words, while the system may only have 20K bytes of space, a text file of 40 or 50K can be edited as the system will bring into memory that portion being worked on and store the remainder on disk, without any interaction on the part of the user. This feature is relevant only for those users with small memory sizes or massive documents. An author, for example, would necessarily demand this feature.
13. *Space Left.* In systems with no virtual memory (as described in #12 above), a method must be employed to indicate to the user that the system is about to run out of memory. Some systems, such as Memorite, include an indication of the amount of available memory left.
14. *What you see is what you get.* There are two generic classes of word processors—those in which the CRT screen portrays an approximation of what the printed output will be like and those in which the CRT display bears no resemblance to the format of the printed page.
15. *Delete Function.* The delete function should allow the user to edit a file by deleting words, line and paragraphs. For example, Power Text allows the user to delete whole lines at a time, but contains no provisions to delete a whole word at a time, nor a whole paragraph at a time.
16. *Special Characters.* The ability to input special characters is of interest to sophisticated users only. Occasionally the ability to input a control character can be of use in the toggling of special printer functions. Most users will not need to use special characters.
17. *Multiple Columns of Text.* Word processors are excellent for producing company newsletters and the like—and the ability to generate multiple columns of text per page is valuable in creating the typeset look.
18. *Terminal Features.* Many sophisticated terminals have capabilities such as highlighting (variable intensity of characters displayed), underscoring (normally not done on a video display) and blinking cursors or characters. It is up to the software engineer, however, to utilize these features in the applications program.
19. *Page Breaks.* Sometimes it is useful, particularly in the case of a "what-you-see-is-what-you-get" program, to see the position —relative to the text of the page breaks.

20. *Other Files.* Some word processors can deal only with their own particular type of file structure. This bars the user from employing the word processor as a general text editor for generating program listings, editing graphics files and creating ASCII data files. The system that can process other kinds of files is generally more useful.
21. *Special Function Keys.* If available on the terminal, special function keys can make the operation of a word processing program easier.
22. *Spelling Checker.* These programs test the combinations of letters shown as words against a complex algorithm to determine whether any unusual items appear. Unusual words are flagged for the user as possible misspellings. Technical terms and foreign words are normally not tested. Some systems include a "self-teach" function that allows the system to "learn" certain special user words.
23. *Automatic Save.* This program feature saves the text file under edit at certain intervals automatically and without user interaction. It is extremely useful in a production environment, such as writers who often lose contact with the reality while concentrating on writing.
24. *Math Program.* A math program allows the user to put the word processor to work as an information processor. Accountants and others who use word processing to produce financial reports and analyses find that math programs that allow the word processor to add up columns and cross and rows of figures are valuable features.
25. *Formatting.* The options available to the user in formatting text can make the difference between a finished product that appears typed and one that has the look of a typeset piece. There are a wide variety of features, ranging from the ability to double-underscore (as in column totals) to the ability to trigger the change in ribbon color (as in the IDS Prism color printers). Some systems allow the users to change the line spacing by tenths of an inch, while others allow only single, double and triple spacing. Some programs allow the user to custom-configure the system to take advantage of special printer features.
26. *Headers and Trailers.* The ability to put an automatic header in the text file allows for very professional-looking correspondence and reports. Trailers, which appear at the bottom of the page, can be used for the same purposes. This feature is especially useful in business reports.
27. *Margins.* The ease with which margins can be set, and the flexibility that the user has in setting margins are important factors in the choice of any word processor. The critical elements are: can the user set right and left margins; can he use more than one setting with the same document (i.e. at different parts of the text, the margins are different); can he set the top and bottom margins, and can he have more than one setting within the same document (at different pages).
28. *Print Spooling.* This feature allows the user to be printing out a file while editing another. Useful only in systems that have extremely fast disks (such as a hard disk) and in which the hardware is running at a very fast clock speed. This feature is essentially a sort of multiprocessing.
29. *Real-time Printing Commands.* Most systems allow the user to abort a printout or at least pause the printing function. It's useful when its determined that you're printing the wrong file, or the forms are in backwards, or the ribbon breaks.
30. *Beginning Print Position.* In many systems, this position is user-definable. A "y" in this column indicates that the user has the capability of indicating a beginning print position of other than the beginning of the file.
31. *Non Printing Comments.* Some systems allow the user to insert notes and comments into the text file that are viewable at the console during edit but do not appear in the final printout of the file.
32. *Non-Formatted Text.* Occasionally, it is necessary or desirable to print out the text in a non-formatted fashion. In such a printout, the line justification will be ignored, and line-per-inch spacing and characters-per-inch commands will default.
33. *Margin Release.* This operates just like a typewriter margin release, and is commonly found only on "what-you-see-is-what-you-get" software.
34. *Auto Link.* This feature allows the user to print one file—then automatically link to another file that is similarly written out. It is a very useful feature for authors of books or long reports.
35. *Index and table of Contents.* In some word processing systems, the user can build an index or table of contents at the same time as text is being entered. Key words are noted and the system keeps track of page locations. The user is later able to have the system produce an index that contains the alphabetical list of key-words and their page number references.
36. *Print-time Features.* In the production of chain letters, it is useful to be able to enter data during the printing operation. This feature allows the user to send letters to lists without creating a separate address file. Another feature that is useful is the ability to change diskettes during printing. This is often necessary, particularly if the chain letter and the address list reside on different diskettes. Some systems have provisions for display of messages to the operator during the print cycle, which may be used to prompt for the input of additional information or to indicate the status of the printing task.

Charts follow

Chart 1. Company and Configuration Data

COMPANY'S NAME AND ADDRESS	PRODUCT NAME	PRICE	COMPATIBLE HARDWARE	OPERATING SYSTEM	DOCUMENTATION				
					1) TUTORIAL	2) REFERENCE	3) HELP MENU	4) QUICK REFERENCE CHART	5) INDEX
A.B. Computers Bethlehem Park, Colmer, PA 18915	Paper Mate	$40	Pet, CBM, Vic, C64	resident	y	y	n	y	n
The Alternate Source 704 N. Pennyslvania Ave., Lansing, MI 48906	Word Wizard	$30	TRS-80 Model I, Model II	Level II TAPE	y	y	n	y	n
Apple Computer, Inc. 20525 Mariani Ave., Cupertino, CA 95014	Apple Writer II	$150	Apple II	DOS	y	y	y	y	y
Artsci, Inc. 10432 Burbank Blvd., N. Hollywood, CA 91601	Magic Window	$100	Apple II, II Plus; III in II Emulation mode	DOS 3.3	n	y	n	y	n
Aspen Software Co. Box 339-A, Tijerus, NM 87059	Writer's Companion	$244, TRS-80 I, III; $399, IBM PC, CP/M	TRS-80 I, II, III CP/M, IBM PC DOS	TRSDOS, CP/M, PC-DOS	y	y	n	y	y
Astro-Star Enterprises 5905 Stone Hill Dr., Rocklin, CA 95677	Letter Writer II	$57	TRS 80 I, II	TRSDOS	y	y	y	y	y
Beaman Porter, Inc. Pleasant Ridge Rd., Harrison, NY 10528	Power Text	$399, $299, $199	IBM PC, Apple II, Apple III	WCSD P-System	y	y	n	n	y
Blechman Enterprises 7217 Bernadine Ave., Canoga Park, CA 91307	Speed Letter	$14.95	TRS-80 Model I, II	Cassette-Based, Disk-Compatible	n	y	n	n	n
Business Solutions, Inc. 60 East Main St., Kings Park, NY 11754	Jack	$79	Apple II	Apple Pascal	y	y	n	y	y
CE Software 238 Exchange St., Chicopee, MA 01013	Letter Writer II	$20	Atari 400/800	Atari Basic	y	y	y	n	n
Cado Systems Corp. 2771 Toledo, Torrance, CA 90503	WP III	n/a	n/a	CADOL	y	y	n	y	n
CompuView Products, Inc. 1955 Pauline Blvd., Ste. 200, Ann Arbor, MI 48103	Vedit	$150, Z80/8080; $195, 8086/8088	most Z80, 8080, 8085, 8086, 8088	MSDOS, CP/M-86, CP/M, CDOS, MP/M, MP/M-86	n	y	n	y	n
Data Most Inc. 9748 Cozycroft, Chatsworth, CA 91311	Write-On!	$130	IBM PC, Apple II, III	MSDOS, Apple II DOS, Apple III DOS	y	y	n	y	y
Datasoft Inc. 19519 Business Ctr. Dr., Northridge, CA 91324	Text Wizard	$100	Atari 800	Atari DOS	y	y	n	y	y
Data Soft of NH 22 Stevens Ave., Marrimack, NH 03054	Manuscript Writer	$17	TRS-80 I, II	Lev I/III, 16K, cassette, printer	y	n	n	n	n
Datek Systems, Inc. 4786 Lee Highway, Arlington, VA 22207	Letter Go	$495	North Star	North Star DOS	y	y	y	y	n
Desginer Software 3400 Montrose #718, Houston, TX 77006	Palantir w/Mailout	$450	most Z80, 8080, 8085, 8086, 8088	CP/M, MSDOS CP/M-86	y	y	y	y	y
Dwo Quong Fok Lok Sow, Inc., 548 Broadway Ste. 4-F, New York, NY 10012	Quick Brown Fox	n/a	n/a	CP/M-86, MSDOS	y	y	y	y	y
Hayden Software Co. Box 8428, 600 Suffalk St., Lowell, MA 01853	Pie Writer	$150	Apple II	Apple DOS 3.3	y	y	y	y	y
IJG, Inc. 1260 W. Foothill Blvd., Upland, CA 91768	Electric Pencil 2.0Z	$100	TRS-80 I, III	TRSDOS, NEWDOS 80	n	y	n	y	y
Information Unlimited Software 2401 Marinship Way, Sausalito, CA 94965	EasyWriter II	$350	IBM PC	ASP	y	y	y	y	y
Info Soft Systems, Inc. 25 Sulvan Rd. S., Westport, CT 06880	Wp Daisy	n/a	Z80, 8080, 8085	I/OS, UNI/OS, MULTI/OS, CP/M	y	y	n	y	n
LJK Enterprises, Inc. Box 10827, St. Louis, MO 63125	Letter perfect	$150	Apple II + II Plus, Atari 400/800	LJK DOS	y	y	y	y	y
Lifetree Software, Inc. 177 Webster, Ste. 342, Monterey, CA 93940	Volkswriter	$195	IBM-PC	DOS 1.0 and 1.1	y	y	y	y	y
Mark of the Unicorn Box 423, Arlington, MA 02174	The Final Word	$300	n/a	CP/M, PC DOS	y	y	y	y	n
Metasoft Corp. 711-E East Cottonwood Ln., Casa Grande, AZ 85222	Benchmark Version 3	$500	most Z80, 8080, 8085, 8086,8088	CP/M, MSDOS N-DOS, G-DOS	n	y	y	y	y
Micro Architect, Inc. 96 Dothan St., Arlington, MA 02174	Word	$49	TRS-80 I, II, III, 16; Xerox 820; Altos; IBM PC	TRSDOS I, II, III, 16; CP/M 2.2; IBM DOS	y	y	n	n	n

Key

y — yes; feature is included
n — no; feature is not included
n/a — information not available



WORDCRAFT 20 ...A First! Word Processing for VIC 20®

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Wordcraft 20© is easy to use; it won't confuse you. Your words will appear on the screen just as you've written them. This fully featured system lets you do what you need to do . . . change a character, a word, or an entire block of copy . . . arrange and rearrange the text . . . set the tabs and margins . . . adjust the line lengths . . . move the copy up and down, left or right, so you see every word on the screen . . . before you print. Wordcraft 20© gives you personal word processing with professional results. Plug Wordcraft 20© into your VIC® today . . . see for yourself just what words will do. Available exclusively from your local UMI dealer.

umi

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CIRCLE NO. 108 ON INQUIRY CARD

Chart 1. Company and Configuration Data (continued)

COMPANY'S NAME AND ADDRESS	PRODUCT NAME	PRICE	COMPATIBLE HARDWARE	OPERATING SYSTEM	DOCUMENTATION				
					1) TUTORIAL	2) REFERENCE	3) HELP MENU	4) QUICK REFERENCE CHART	5) INDEX
Micro Concepts 222 22nd St., Huntington Beach, CA 92648	Super Vue	$1,000	Alpha Micro	AMOS	y	y	y	n	n
Micro Pro Int'l Corp. 33 San Pablo Ave., San Rafael, CA 94903	WordStar	$495	CP/M-based	CP/M	y	y	y	y	y
Midwest Software Associates Box 301, St. Ann, MO 63074	Write Away	$175	Apple II, II Plus	DOS 3.2 or 3.3	y	y	y	y	y
Muse Software 347 N. Charles St., Baltimore, MD 21201	Super-Text 40/80	$175	Apple II, II Plus	n/a	y	n	n	y	n
NEC Home Electronics 1401 Estes Ave., Elkgrove, IL 60007	NEC	$495	PC8000	CP/M	y	y	y	n	y
Northern Telecomp, Inc. Box 1222, Minneapolis, MN 55440	Omniword	$600-$1,800	503A, 585	Omnitask	y	y	y	n	n
North Star Computers 14440 Catalina St., San Leandro, CA 94577	NorthWord	$199	North Star Advantage + Horizon	ASP, TSS/A	n	y	n	n	n
On-Line Systems 36575 Mudge Ranch Rd., Coarsegold, CA 93614	Screen Writer II	$130	Apple II Plus	n/a	y	y	y	y	y
Peachtree Software Inc. 3445 Peachtree Road, NE, Atlanta, GA 30326	PeachText	$500	Z80, 8080, 8085	CP/M	y	y	y	y	y
Perfect Software 1400 Shatluck Ave., Berkeley, CA 94709	Perfect Writer	$495	CP/M, MSDOS, PC-DOS	Apple + CP/M	y	y	y	y	y
ProSoft Box 560, N. Hollywood, Ca 91603	Newscript	$125	TRS 80 I, III	TRSDOS, NEWDOS NEWDOS/80, DOS Plus LDOS, MULTIDOS	y	y	y	y	y
Quark Engineering 1433 Williams, Ste. 1102, Denver, CO 80218	Word Juggler	$295	Apple III	Apple Computer's S.O.S	y	y	y	y	y
Radio Shack 1800 One Tandy Center, Fort Worth, TX 76102	Super Scripsit	$199	TRS 80 I, III	TRSDOS	y	y	y	y	y
Select Information Systems 919 Sir Francis Drake Blvd. Kentfield, CA 94904	Select	$595	CP/M-based	CP/M, MP/M, CDOS	y	y	y	y	y
Softlink 3255-2 Scott Blvd., Santa Clara, CA 95051	Office Integrator	$500	CP/M-based, 8080, 8085, Z80	CP/M	y	y	y	y	n
Sorcim Corp. 405 Aldo Ave., Santa Clara, CA 95050	Super Writer	$395	Z80, 8080, 8085	CP/M 2.2, CP/M 86, MSDOS	y	y	y	y	y
Structured Systems Group 5204 Claremont Ave., Oakland, CA 94618	Word Right	$500	Z80, 8080, 8085	CP/M 2.2	y	y	y	y	y
TRW-Fujitsu 9841 Airport Blvd., Los Angeles, CA 90045	Word 16	n/a	Affinity 16	Monitor	n	y	y	n	n
Threshold Software, Inc. 1832 Tribute Rd., Ste. E., Sacramento, CA 95825	Write/Idea 83/85	$250	Hewlett-Packard HP-83/85	H-P proprietary	y	y	n	y	n
Timberline Systems, Inc. 10550 SW Allen Blvd., Beaverton, OR 97005	R Systems word processing	$2,900	Texas Instruments	DX 10	y	n	y	y	y
Vector Graphic 500 N. Ventu Park Rd., Thousand Oaks, CA 91320	Memorite III	$450	All Vector systems	CP/M 2.2	y	n	y	y	y
Westico Inc. 25 Van Zant St., Norwalk, CT 06855	Final Word	$300	IBM PC, 8080, Z80	IBM DOS, MSDOS, CP/M-80	y	y	y	y	y

Key

y — yes; feature is included
n — no; feature is not included
n/a — information not available

Charts continue on page 55

How to tell an Epson HX-20 from an ordinary computer.



EPSON

Actu

The size, of course, is a dead giveaway. But don't let the size fool you. The HX-20 is not a toy. Or a glorified calculator.

It's a computer.

A real computer, with 16K RAM (optionally expandable to 32K), and 32K ROM (optionally expandable to 64K), RS-232C and serial interfaces, a full-size ASCII keyboard, a built-in printer, a scrollable LCD screen, and sound generation. A micro-cassette and ROM cartridge are available as options.

Viva la différence!

In fact, the only differences between the Epson HX-20 and an ordinary computer are:

1) The HX-20 is small enough to fit inside your briefcase;
2) It'll run on its own internal power supply for 50-plus hours, and fully recharge in less than eight;
3) It gives you up to 10 program functions at the punch of a button;
4) It lets you interface with peripherals like the MX Series printers for correspondence quality output, the CX-20 Acoustic Coupler for remote communications, a barcode reader for inventory control, and an audio cassette for loading and saving programs;
5) It lets you shut the whole unit off while preserving all programs in RAM; and, last, but far from least,
6) It costs less than $800. That's right—less.

The perfect traveling companion.

With the Epson HX-20 and the optional RAM expansion, you'll be able to compute just about anywhere. Because its nickel-cadmium batteries and a low-power, all-CMOS memory keep the HX-20 running for over 50 hours. And even if you shut the HX-20 off, a low-voltage system maintains all programs you have in RAM.

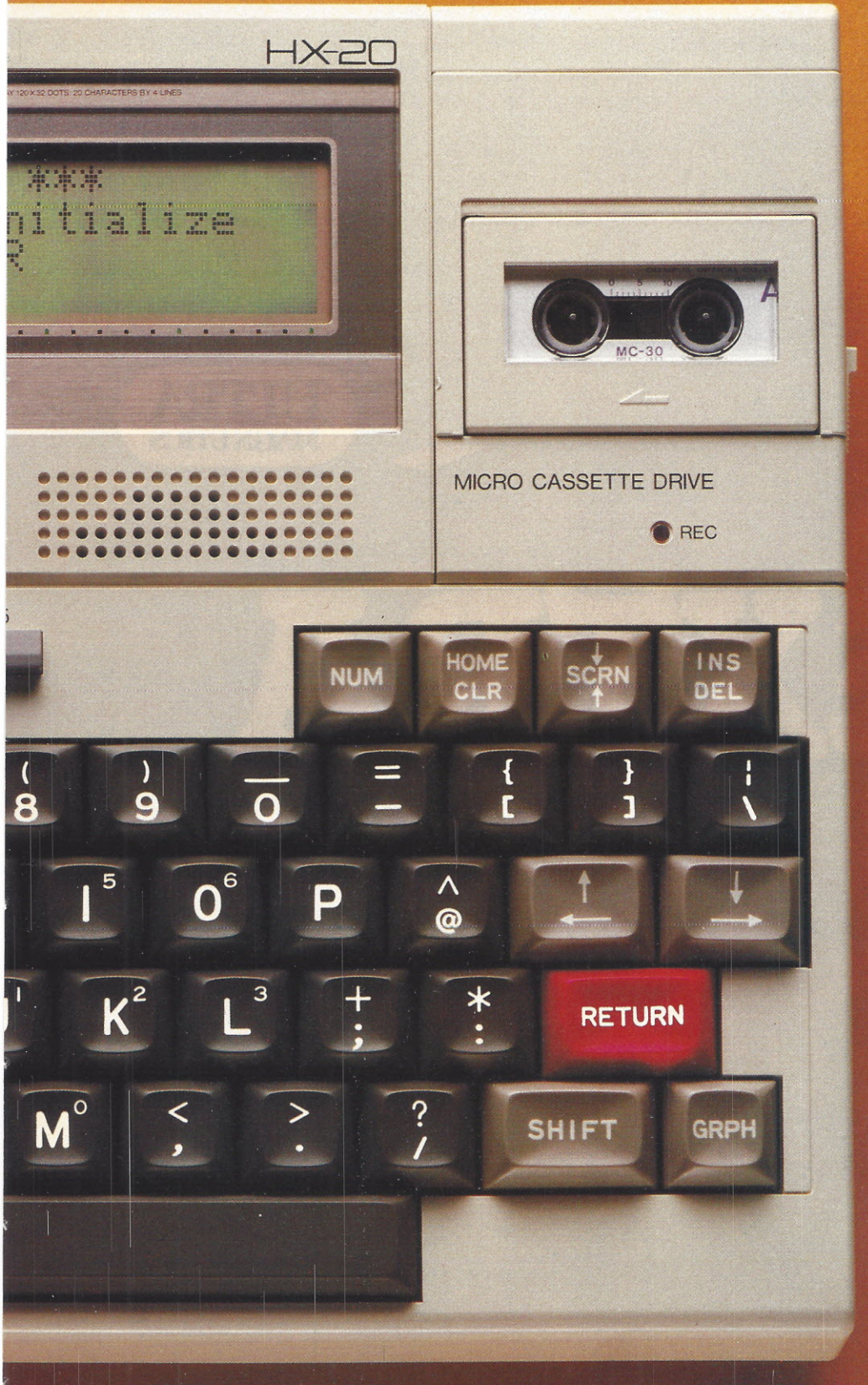
Little screen, big picture.

The HX-20's unique scrollable LCD screen is the ultimate answer to the question, "How do you get a big screen in a small space?" You just show part of it at a time.



l size.

Optional Microcassette



So with the HX-20, you can do programming, word processing and data entry just like you've got a big screen, up to 255 characters wide, with easy-to-read upper and lower case letters, numbers and punctuation and any 20 column by four line part of it visible by user command.

Built in hardcopies.

The HX-20's built-in 24 column dot matrix impact microprinter hands hardcopies to you at 42 LPM, in a crisp, precise 5x7 matrix. It even has bit addressable graphics to give you a pint-sized sales chart, and enough international symbols to print most Western languages.

Epson makes more and better printers than anyone else in the world. Need we say more?

The best is yet to come.

When you hold an HX-20 in your hand, you're not only holding a lot of capacity, you're holding a lot of expansion.

There's a standard cassette interface, a cartridge interface, the RS-232C and serial interfaces, and a system bus that lets you expand RAM and ROM capabilities. There's even a floppy disc drive for maxi capacity in a mini package.

The Epson edge.

Surprised that a computer like the HX-20 should come from Epson? You shouldn't be. Because we've been building computers in Japan since 1978. And we've been practicing ultra-high-quality precision manufacturing for a lot longer than that.

We didn't jump right into the American microcomputer market. We could afford to bide our time; to wait for the product that was going to stand America on its ear.

This is it.

The Epson HX-20.

EPSON

EPSON AMERICA, INC.

COMPUTER PRODUCTS DIVISION

3415 Kashiwa Street
Torrance, California 90505
(213) 539-9140

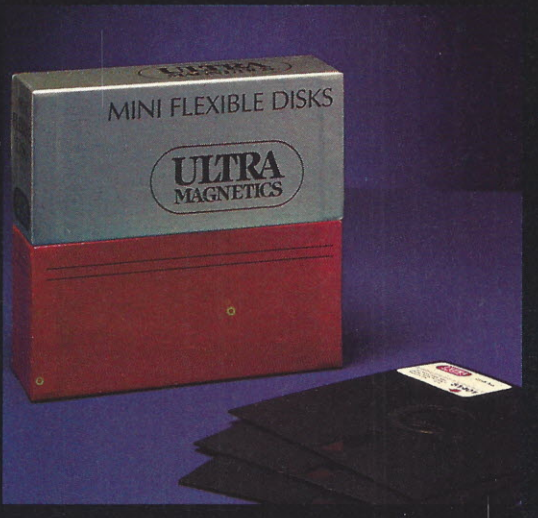
CIRCLE NO. 107 ON INQUIRY CARD

There is a word that describes your choices in flexible disks today. That word is "ordinary." The woods seem to be full of offerings of middling quality, neither good nor bad, not necessarily cheap but not overly expensive for the most part, products that are just so-so, just average, just...well, just ordinary.

But now there's a new word in flexible disks. Ultra Magnetics. A word that redefines the state-of-the-art in flexible disk price performance rather than reinforcing the current state-of-the-marketplace. By itself, *Ultra* means "extra ordinary." And by itself is where you'll place the Ultra Magnetics product when you have a chance to compare it to others.

The superb engineering and meticulous manufacturing of each Ultra Magnetics disk clearly shows. A proprietary jacket provides more consistent jacket dimensions and lower torque that result in better auto-loading and longer life. A special lubricant built into each disk surface enhances both disk and head durability. And 100% surface testing of each and every Ultra Magnetics disk ensures the highest data reliability. Our Ultra Magnetics product line currently includes single- and double-sided 5.25-inch disks. Soon, it will feature 8-inch disks as well. For a fact, they are more expensive than some of the garden variety alternatives. But considering the performance and the reliability, Ultra Magnetics is a surprisingly attractive value.

Here's the bottom line. You no longer have to put up with what you may have sadly come to expect from flexible disks. And we encourage you to take the next logical step from the usual to the remarkable—from the ordinary to the extraordinary. Call your local supplies distributor and ask for Ultra Magnetics.



ULTRA MAGNETICS

Ultra Magnetics Technology, Inc.
7 Hangar Way
Watsonville, CA 95076
(408) 728-7777

EXTRA ORDINARY



CIRCLE NO. 94 ON INQUIRY CARD

Chart 2. Entering and Editing Text

PRODUCT NAME	ENTER AND EDIT TEXT							10) POSITION DISPLAY TELLS PAGE/LINE	11) CURSOR ADDRESS BY PAGE/LINE	12) AUTOMATIC DISK BUFFER	13) "SPACE-LEFT" INDICATOR	14) WHAT-YOU-SEE-IS-WHAT-YOU-GET	15) DELETE FUNCTION		
			8) TO FILE UNDER EDIT			9) TO FILE ON DISK									
	6) RULER	7) AUTO CENTER	APPEND TEXT	INSERT TEXT	WRITE-OUT BLOCK	APPEND TEXT	INSERT TEXT AT SPECIFIC PLACE						WORD	LINE	PARAGRAPH
Paper Mate	n	y	y	y	y	n	n	n	n	n	n	n	n	n	y
Word Wizard	n	y	y	n	y	n	n	n	y	n	y	n	n	n	n
Apple Writer II	n	n	y	y	y	n	n	y	n	n	y	y	y	n	y
Magic Window	n	y	y	y	y	n	n	y	y	n	n	y	n	y	n
Writer's Companion	n	y	y	y	n	n	n	n	n	y	y	n	y	y	n
Letter-Writer II	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
Power Text	n	y	y	y	n	n	n	n	n	n	y	n	n	y	n
Speed-Letter	n	n	y	y	y	n	n	y	y	n	n	y	n	y	y
Jack	y	n	y	y	y	n	n	y	y	y	n	y	n	y	n
Letter Writer II	n	n	n	n	n	n	y	y	y	n	y	n	y	y	n
WP III	y	y	y	y	y	n	n	y	y	y	y	y	y	y	y
Vedit	n	n	y	y	y	y	y	y	n	y	y	y	y	y	y
Write-On!	n	y	y	y	y	y	y	n	y	n	n	y	y	y	y
Text Wizard	n	y	y	n	n	n	n	n	n	n	n	n	n	y	y
Manuscript Writer	n	n	n	n	n	y	n	n	y	n	n	y	n	y	n
Letter Go	n	y	y	y	n	y	y	n	n	n	y	y	n	y	n
Palantir	y	y	y	y	y	n	n	y	n	y	y	y	y	y	y
Quick Brown Fox	n	y	y	y	n	n	n	n	n	n	y	y	y	n	y
Pie Writer	y	y	y	n	n	n	n	y	y	n	y	n	y	y	y
Electric Pencil 2.0Z	y	y	y	y	y	n	n	n	n	n	y	n	n	y	y
Easy Writer II	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
Wp Daisy	y	y	y	y	y	y	y	n	n	n	y	y	y	y	y
Letter Perfect	n	y	y	y	n	n	n	n	n	n	y	y	y	y	y
Volkswriter	y	y	y	y	y	n	n	n	n	n	y	y	y	y	y
The Final Word	n	y	y	y	y	y	y	n	n	y	y	y	y	y	y
Benchmark Version 3	y	y	y	y	y	n	n	y	y	y	y	y	y	y	y
Word	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n
Super Vue	y	y	y	y	y	n	n	n	n	y	n	y	y	y	n
WordStar	y	y	n	n	y	y	y	y	n	y	n	y	y	y	y
Write Away	n	y	y	n	n	y	n	n	n	n	y	y	n	y	n
Super-Text 40/80	n	y	y	y	y	y	y	n	n	n	y	n	y	y	y
NEC	y	y	y	y	y	y	n	y	y	n	y	y	y	y	y
Omniword	y	y	y	y	y	y	n	y	y	y	y	y	y	y	y
North Word	n	y	n	n	n	y	y	n	n	n	y	y	n	y	y
Screen Writer II	n	y	y	y	y	y	y	y	y	y	y	y	y	y	n
PeachText	n	y	n	y	n	n	y	n	n	n	y	n	y	y	y
Perfect Writer	n	y	y	y	y	y	y	y	y	y	n	y	y	y	y
Newscript	n	y	y	y	y	y	n	n	n	n	y	n	y	y	y
Word Juggler	y	y	y	y	y	n	n	y	n	n	y	y	y	y	y
Super Scripsit	y	y	y	y	y	y	y	y	y	n	y	y	y	y	y
Select	n	y	y	y	y	y	y	y	y	y	y	y	y	y	n
Office Integrator	y	y	y	y	y	n	n	y	y	n	y	y	y	y	y
Superwriter	n	y	y	y	y	n	n	n	n	n	y	y	y	y	n
Word Right	y	y	y	y	y	n	n	y	n	y	n	y	y	y	y
Word 16	y	y	y	y	n	n	n	y	y	y	y	y	y	y	y
Write Idea 83/85	n	y	y	n	y	n	n	n	n	n	y	n	y	n	n
R Systems Word Processing	y	y	y	y	y	y	n	y	y	y	y	y	y	y	y
Memorite III	n	y	y	y	n	n	n	n	n	n	y	n	y	y	y
Final Word	n	y	y	y	y	y	y	y	n	y	n	y	y	y	y

Key

y — yes; feature is included n — no; feature is not included n/a — information not available

Chart 2. Entering and Editing Text (continued)

PRODUCT NAME	16) SPECIAL CHARACTERS CAN BE INPUT		17) MULTIPLE COLUMNS OF TEXT PER PAGE	18) TERMINAL FEATURES			19) PAGE BREAK DISPLAYED	20) CAN LOAD OTHER KINDS OF FILES	21) USES SYSTEM SPECIAL FUNCTION KEYS	MAXIMUM SIZE (COLUMNS)	22) SPELLING CHECKER	23) AUTOMATIC SAVE	24) MATH PROGRAM
	CONTROL	GRAPHING		HIGHLIGHT	UNDERSCORE	BLINK							
Paper Mate	y	y	n	n	n	n	n	y	y	132	n	n	n
Word Wizard	y	y	n	n	n	n	n	n	n	512	n	n	n
Apple Writer II	y	n	n	n	n	n	y	y	y	80	O	n	n
Magic Window	y	y	n	y	n	y	y	n	y	80	n	n	n
Writer's Companion	y	y	n	y	y	y	n	y	y	240	S	y	n
Letter-Writer II	y	y	y	n	y	y	y	y	y	256	n	n	AC
Power Text	y	y	y	n	n	n	y	y	y	132	n	n	n
Speed-Letter	n	n	n	n	n	n	n	n	62	no limit	n	n	n
Jack	n	n	y	n	n	n	y	n	y	80	n	y	AC,CF %
Letter Writer II	y	y	y	y	n	n	n	n	y	132	n	n	n
WP III	y	n	n	n	n	n	y	y	y	no limit	n	n	AC,CF %
Vedit	y	y	y	y	y	y	n	n	y	255	O	n	n
Write-On!	y	n	y	n	n	n	y	y	y	225	O	n	n
Text Wizard	n	n	y	n	n	n	n	y	y	no limit	n	n	n
Manuscript Writer	n	n	n	n	n	n		n	n	no limit	n	n	n
Letter Go	n	n	n	n	n	n	y	y	y	80	n	n	n
Palantir	n	n	n	y	y	n	y	y	y	250	O	y	G
Quick Brown Fox	y	y	n	y	y	y	n	y	y	128	O	n	G
Pie Writer	y	y	n	n	n	n	n	y	y	128	S,O	n	n
Electric Pencil 2.0Z	n	n	y	n	n	n	y	n	y	255	n	n	n
Easy Writer II	n	n	n	y	y	n	y	y	y	254	S	y	n
Wp Daisy	y	n	n	n	y	n	y	n	y	132	S,O	n	n
Letter Perfect	y	n	n	y	n	y	y	y	y	256	O	n	n
Volkswriter	y	y	n	y	n	n	y	y	y	80	O	y	n
The Final Word	n	n	n	y	y	y	n	y	y	80	n	y	n
Benchmark Version 3	n	y	n	y	y	y	y	y	y	155	S	y	AC,CF
Word	n	n	n	n	n	n	n	n	n	no limit	n	n	n
Super Vue	n	n	n	y	y	n	y	y	y	65,536	I	n	AC,CF %
WordStar	y	n	y	y	n	n	y	y	y	240	S	n	n
Write Away	y	y	n	n	n	n	n	y	y	no limit	O	n	G
Super-Text 40/80	y	n	n	y	y	n	y	n	y	no limit	S,O	y	AC
NEC	y	y	n	y	y	n	n	y	y	80	S	y	n
Omniword	y	n	y	y	n	n	n	y	y	160	n	y	G
North Word	n	n	n	n	y	n	y	n	y	no limit	n	y	n
Screen Writer II	y	y	y	n	y	n	y	y	y	no limit	S	y	n
PeachText	y	n	y	n	y	n	y	y	y	132	S,O	y	n
Perfect Writer	y	n	y	y	n	y	n	y	y	252	I,S	y	AC,CF %
Newscript	y	y	n	n	n	n	n	y	y	240	S,O	y	G
Word Juggler	y	n	n	n	n	n	y	y	y	254	I	n	n
Super Scripsit	y	n	y	n	n	n	n	y	y	132	S	n	n
Select	n	n	n	n	n	n	y	y	y	254	I	n	n
Office Integrator	y	n	y	y	y	n	y	y	y	80	S	n	n
Superwriter	n	n	n	y	y	n	y	n	y	80	I	n	n
Word Right	n	n	n	y	n	n	y	y	y	80	S	y	n
Word 16	y	n	y	y	y	n	y	y	y	132	I	n	AC
Write Idea 83/85	y	n	n	n	n	n	n	y	y	140	n	n	n
R Systems Word Processing	y	n	y	y	y	n	y	y	y	156	I	n	CF,G, AC %
Memorite III	y	n	y	y	n	n	y	y	y	200	S	n	n
Final Word	y	y	n	y	y	n	y	y	y	240	O	y	n

Key

y — yes; feature is included n — no; feature is not included n/a — information not available

Under "Spelling Checker"
I — integrated O — other vendor S — separate program called after edit

Under "Math program"
AC — adds columns CF — crossfoots % — computers percents G — global (bottom chk-off)

Chart 3. Printing and Output

PRODUCT NAME	25) FORMATTING														26) AUTO HEADERS/TRAILERS	PAGE NUMBERING	FOOTNOTES	PAGE LENGTH	RIGHT & LEFT USER MODIFIABLE
	UNDERSCORE	DOUBLE UNDERSCORE	DOUBLE STRIKE	STRIKE-OUT	BOLD FACE	SUBSCRIPT	SUPERSCRIPT	CHANGE RIBBON COLOR	CHANGE CHARACTER PITCH	BACKSPACE/ OVERTYPE	JUSTIFY	CHANGE LINES PER INCH	DOUBLE/TRIPLE SPACE	SPECIAL OR USER-DEFINED PRINT FEATURES					
Paper Mate	n	n	n	n	y	y	y	n	n	n	y	y	y	y	y	B,U	n	U,V,C	y
Word Wizard	y	n	y	n	y	y	y	y	y	y	y	y	y	y	y	B,U	n	U,V	y
Apple Writer II	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	T,B,U,R	B,A	U,V	y
Magic Window	y	n	n	n	y	y	y	n	y	n	y	n	n	y	y	T,B,U	U	U	y
Writer's Companion	y	n	y	y	y	y	y	y	y	y	y	y	y	y	y	T,B,U	B,A	U,V,C	y
Letter-Writer II	y	y	y	n	y	y	y	n	y	n	y	y	y	n	y	U	U,A,M,N	U,V	y
Power Text	y	y	n	n	y	y	y	y	y	y	y	y	y	y	y	R,U	E,M,N	U,V,C	y
Speed-Letter	n	n	n	n	n	n	n	n	n	n	y	n	y	n	n	T	n	U	y
Jack	n	n	n	n	n	n	n	n	n	n	n	n	n	y	n	n	B,E,U,A	U	y
Letter Writer II	y	n	y	y	y	y	y	y	y	y	y	y	n	y	n	U	M	U,V	n
WP III	y	n	y	n	y	y	y	n	y	y	y	y	y	y	y	U,R	A	U,V,C	y
Vedit	n	n	n	n	n	n	n	n	n	n	n	n	n	y	n	n	n	n	y
Write-On!	y	n	y	n	y	n	n	n	n	y	y	n	y	y	y	T,B,U,S,R	B,E,M	U,V	y
Text Wizard	y	n	y	n	y	y	y	n	y	n	y	n	y	n	y	U,R	n	U	y
Manuscript Writer	n	n	n	n	n	n	n	n	n	n	y	n	n	n	n	T	M	n	y
Letter Go	y	n	n	n	y	y	y	n	y	n	y	y	y	n	y	U	n	U,V	y
Palantir	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	U,S,R	M	U,C	y
Quick Brown Fox	y	n	y	y	n	n	n	n	y	n	y	y	y	y	y	U	n	U,V,C	y
Pie Writer	y	n	y	n	y	y	y	y	y	y	y	n	y	y	y	T,B,U,R	B	U,V,C	y
Electric Pencil 2.0Z	y	n	y	n	n	n	n	n	n	n	y	n	y	n	y	T,U	n	U,V	y
Easy Writer II	y	y	y	y	y	y	y	y	y	y	y	y	y	n	y	T,B,U,R	B,U,M	U,V	y
Wp Daisy	y	n	n	n	y	n	n	n	n	n	y	n	y	n	y	T,U	B	U,V	y
Letter Perfect	y	y	y	n	y	y	y	y	y	y	y	y	y	y	y	T,B,U,R	B,U,A,N	U,V,C	y
Volkswriter	y	n	y	y	y	y	y	y	y	y	y	y	y	y	y	T,B,U	n	U,C	y
The Final Word	y	n	y	n	y	y	y	n	y	y	y	y	y	y	y	T,B,U,R	B,F,U,A,M,N	U,V	y
Benchmark Version 3	y	y	y	y	y	y	y	y	y	y	y	y	y	n	y	U,R	B,A,N	U,V,C	y
Word	n	n	n	n	n	n	n	n	n	n	y	n	y	y	y	T	n	U	y
Super Vue	y	y	y	n	y	y	y	n	y	n	y	y	y	y	y	T,B,U,R	M	U,V,C	y
WordStar	y	n	y	y	y	y	y	y	y	y	y	y	y	y	y	T,B,U	n	U,C	y
Write Away	y	y	y	n	y	y	y	y	y	y	y	y	y	y	y	B,T,U,R	B,M	U,V,C	y
Super-Text 40/80	y	n	y	n	y	y	y	y	n	y	y	n	y	y	y	U,B	U,A	U,V	n
NEC	y	y	y	n	y	y	y	n	n	n	y	y	y	n	y	T,B,U	U	U,V	y
Omniword	y	n	y	n	y	y	y	y	y	n	y	y	y	y	y	T,B,U	n	U,V,C	y
North Word	y	y	y	y	n	n	n	n	y	y	y	y	y	n	n	B,R	B	U,V	y
Screen Writer II	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	T,B,U,R	B,E	U,V,C	y
PeachText	y	n	n	n	y	y	y	y	y	y	y	y	y	y	n	T,B,U	B,A	U,V,C	y
Perfect Writer	y	n	y	y	y	y	y	y	y	y	y	y	y	n	y	T,B,U	B,E,U,A,M,N	U,V,C	y
Newscript	y	n	y	n	y	y	y	n	y	y	y	y	y	y	y	T,B,U,R	E	U,V,C	y
Word Juggler	y	n	y	n	y	y	y	y	y	n	y	y	y	y	y	T,B,U,R	B,A,N	U,V,C	y
Super Scripsit	y	n	y	y	y	y	y	n	y	y	y	y	y	y	y	T,B,U,R	n	U	y
Select	y	n	n	n	y	y	y	y	y	n	y	y	y	n	y	U	n	U	y
Office Integrator	y	n	y	n	y	n	n	n	y	n	y	y	y	y	n	T,B,U	B,E,U,A	U,V	y
Superwriter	y	n	y	y	y	y	y	y	y	n	y	n	y	y	y	T,B,U	E	U,V,C	y
Word Right	y	y	y	n	y	y	y	n	y	y	y	y	y	n	y	T,B,U,R	E,M	U,V	y
Word 16	y	n	y	y	y	y	y	n	y	n	y	y	n	y	y	B	B,U,A	U,C	y
Write Idea 83/85	y	n	n	n	y	y	y	n	n	n	y	y	y	y	n	U	M	U,V	y
R Systems Word Processing	y	y	y	n	y	y	y	y	y	y	y	n	n	n	y	T,B,U,R	B,E,U,A	U,V	y
Memorite III	y	y	y	n	y	y	y	y	y	y	y	y	y	n	y	U,S	B,A	U,V	y
Final Word	y	y	y	y	y	y	y	n	n	y	y	y	y	n	y	T,B,U,R	B,U,A,N	U,C	y

Key

y — yes; feature is included n — no; feature is not included n/a — information not available

Under "Page numbering"
T — at top B — at bottom U — user choice (position or range) S — user choice of sequence (1,2,3 or 4,5,6) R — relative page numbering

Under "Footnotes"
B — at bottom of page E — at end of text A — automatic placement M — manual placement N — automatic numbering U — user-definable

Under "Page length"
U — user-definable V — variable within text C — conditional page breaks

Chart 3. Printing and Output (continued)

PRODUCT NAME	27) MARGINS			28) PRINT SPOOLING	29)REAL TIME PRINTING		30) BEGIN PRINT USER-CHOOSABLE	31) NON-PRINTING COMMENTS OK	32) PRINT OUT NON-FORMATTED TEXT	33) MARGIN RELEASE	34) AUTO-LINK FROM 1 FILE TO NEXT	PRINTERS	TABBING	35A) TABLE OF CONTENTS	35B) SORTED INDEX	36A) DATA CAN BE ENTERED DURING PRINTING	36B) DISKETTES CHANGED DURING PRINT OK	37) MESSAGES TO OPERATOR DURING PRINT
	MULTIPLE R & L WITHIN ONE DOCUMENT	TOP & BOTTOM USER-MODIFIABLE	MULTIPLE TOP/ BOTTOM MARGINS IN ONE DOCUMENT		PAUSE	ABORT												
Paper Mate	y	y	y	n	y	y	n	y	n	y	y	M,D,U	U	n	n	n	n	n
Word Wizard	y	y	y	n	n	y	L	n	n	n	y	n	D,U	n	n	n	n	n
Apple Writer II	y	y	n	n	n	y	n	y	n	y	y	M,D,U	D,U	n	n	n	y	y
Magic Window	n	y	n	n	n	y	P	n	n	n	n	M,D,U	U	n	n	y	n	n
Writer's Companion	y	y	y	n	y	y	P	y	y	y	y	M,D,U	n	n	y	y	n	y
Letter-Writer II	n	y	n	y	y	y	L,P	y	y	y	y	M,D,U	D,U	n	n	y	y	y
Power Text	y	y	y	y	n	y	L	y	y	y	y	M,D	D,U	y	n	n	y	y
Speed-Letter	n	n	n	n	n	y	L	n	n	n	n	M,D	n	n	n	n	n	n
Jack	n	y	n	n	y	y	n	n	n	n	n	M,D,U	D,U	n	n	n	n	n
Letter Writer II	n	n	n	n	n	n	L	n	y	n	n	U	U	n	n	n	n	n
WP III	y	y	y	y	n	y	P	y	n	y	n	M,D	D,U	n	n	y	n	n
Vedit	y	n	n	n	n	y	L,C	n	n	n	n	U	D,U	n	n	n	n	n
Write-On!	y	y	y	n	y	y	P	n	y	y	y	M,D,U	D,U	n	n	y	y	y
Text Wizard	y	y	y	n	n	n	n	y	n	n	y	M	n	n	n	n	y	n
Manuscript Writer	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
Letter Go	y	y	y	n	y	y	L,C,P	y	n	y	n	M,D	U	n	n	n	n	y
Palantir	y	y	n	n	y	y	P,L	y	y	y	y	M,D	D,U	n	n	y	n	y
Quick Brown Fox	n	y	n	y	y	y	C	n	n	y	n	M,D	D,U	n	n	y	n	n
Pie Writer	y	y	y	y	y	y	P	y	y	y	y	M,D,U	D,U	n	n	y	y	y
Electric Pencil 2.0Z	y	y	y	n	y	y	C	y	n	y	y	M,D,U	n	n	n	n	n	n
Easy Writer II	y	y	y	y	y	y	P	n	n	y	n	M,D,U	D,U	n	n	n	n	n
Wp Daisy	y	y	y	n	y	y	D,C	y	n	y	y	M,D	U	y	n	n	n	y
Letter Perfect	y	y	y	n	y	y	n	y	n	y	y	M,D,U	D,U	n	n	n	y	n
Volkswriter	y	y	y	n	y	y	L,P,C	y	n	y	y	M,D,U	U	n	n	n	y	y
The Final Word	y	y	y	y	y	y	L,P	y	y	y	y	M,D,U	U	y	y	y	n	y
Benchmark Version 3	y	y	y	n	y	y	L,P	y	y	y	y	M,D	D,U	n	n	y	n	n
Word	n	y	n	n	y	y	P	y	y	n	y	M,D	n	n	n	y	y	n
Super Vue	y	y	y	y	n	y	P	y	n	y	y	M	D,U	y	n	n	n	n
WordStar	y	y	y	y	y	y	P	y	y	y	y	M,D,U	D,U	n	n	y	y	y
Write Away	y	y	y	n	y	y	P	y	y	y	y	M,D,U	U	n	n	y	y	n
Super-Text 40/80	y	y	y	n	y	y	C	y	y	y	y	M,D,U	n	n	n	n	n	n
NEC	y	n	y	y	y	y	P	y	y	y	n	M	D,U	n	n	n	n	n
Omniword	y	y	y	n	y	y	P	y	y	y	y	M,D	D,U	n	n	y	y	y
North Word	y	y	y	n	n	y	P	y	n	y	n	M,D,U	n	n	n	n	n	n
Screen Writer II	y	y	y	y	y	y	L,P,C	y	y	y	y	M,D,U	D,U	y	y	y	y	y
PeachText	y	y	y	y	y	y	P	y	y	y	y	M,D,U	U	n	n	n	n	y
Perfect Writer	y	n	n	n	y	y	L,P,C	y	y	y	y	M,D,U	U	y	y	y	n	y
Newscript	y	y	y	y	y	y	P	y	y	y	y	M,D	D,U	y	y	y	y	y
Word Juggler	y	y	y	y	y	y	P	y	n	y	y	M,D,U	D,U	n	n	y	y	n
Super Scripsit	y	y	y	n	y	y	P	y	y	y	y	M,D,U	U	n	n	n	n	y
Select	n	y	n	y	y	y	L,P,C	y	y	y	n	M,D	n	n	n	y	n	y
Office Integrator	y	y	y	n	y	y	C	y	n	y	n	M,D	n	n	n	n	n	n
Superwriter	y	y	y	y	y	y	n	y	y	y	y	M,D	n	n	n	y	y	y
Word Right	y	y	n	n	y	y	L,P,C	n	n	y	n	M,D,U	D,U	n	n	n	n	n
Word 16	y	y	n	n	n	y	P	y	n	y	n	D	U	n	n	n	n	n
Write Idea 83/85	n	n	n	n	y	y	C	n	y	n	y	M,D,U	D,U	n	n	n	y	n
R Systems Word Processing	y	y	n	y	n	y	P	n	y	y	n	M,D,U	D,U	y	y	n	y	n
Memorite III	y	y	y	y	y	y	L,P,C	y	n	n	y	M,D	D,U	n	n	y	n	n
Final Word	y	n	n	y	y	y	P	y	y	y	y	M,D,U	D,U	y	y	n	n	n

Key

y — yes; feature is included n — no; feature is not included n/a — information not available

Under "Begin print user—choosable"
P — by page L — by line C — by cursor position

Under "Printers"
M — dot matrix D — daisywheel U — user-definable

Under "Tabbing"
D — decimal tabbing U — user-modifiable

GOOD NEWS



Have you put aside buying a color monitor because it's too expensive?
But, have you looked at the new TAXAN RGBvision color monitor?
Would you be excited at a suggested retail price of $399.00 for the RGBvision I, and $599 for the RGBvision II?



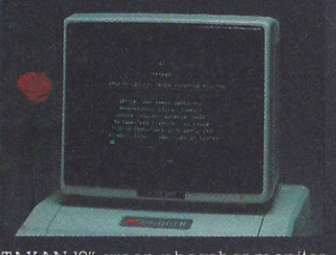


DO WE HAVE GOOD NEWS FOR YOU!

For those low prices, you can have:

- ☑ Full compatibility with Apple III and IBM PC without interface modules
- ☑ Compatible with Apple II through the TAXAN "RGB-II" card
- ☑ RGBvision I medium resolution - 380(H) lines
- ☑ RGBvision II high resolution - 510(H) lines
- ☑ Unlimited colors through linear amplifier video circuit and 16 colors for Apple III and IBM PC
- ☑ 12-inch, 90° deflection CRT display

Can you really afford to turn all that down without looking at the TAXAN RGBvision monitors? See your local dealer for a demonstration.



TAXAN 12" green phosphor monitor, model KG12N, features an 800 line resolution at center, 2000 character display.

TAXAN

TSK ELECTRONICS CORPORATION

1524 Highland Avenue
Duarte, California 91010
A subsidiary of Kaga Denshi

Apple II and III are trademarks of Apple Computer, Inc.
IBM PC is a trademark of International Business Machines, Inc.

CIRCLE NO. 84 ON INQUIRY CARD

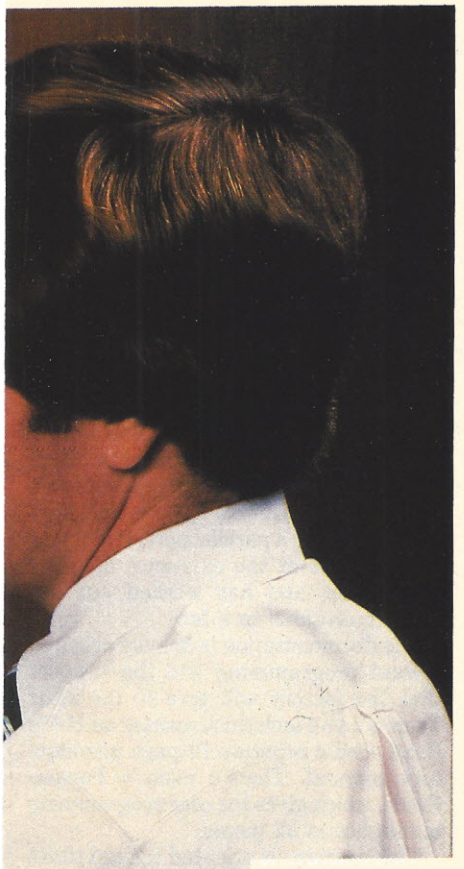


Business graphics capabilities are an important asset to the HP-86 system.

Introducing Two Business Systems from Hewlett-Packard

The HP-86 System

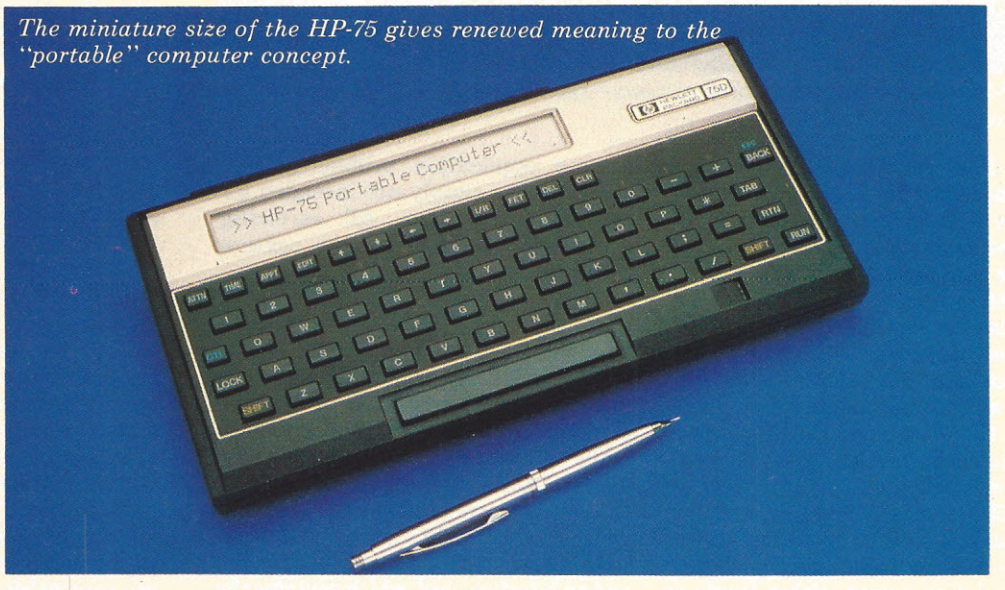
Mention the name Hewlett-Packard (Corvallis, OR) around engineers and you are likely to get a consensus of favorable opinion. The company makes first-class equipment and has the kind of support that sets standards for the rest of the industry to follow. In the scientific community, H-P has one of those legendary reputations





One gets the impression that the solidly-packaged HP-86 could withstand a direct nuclear hit . . . and survive.

Two new offerings from Hewlett-Packard bridge the gap for the active businessperson. The HP-86 provides a versatile desktop unit, while the portable HP-75 can be taken into the field for remote access.



The miniature size of the HP-75 gives renewed meaning to the "portable" computer concept.

—not unlike those of IBM or Burroughs in the business community. Until recently, however, H-P has not been seriously commited to the business computer market. That is about to change. One of the new generation of business computers, the HP-86 represents a strong contribution to the field.

To fully appreciate the machine, one has to realize the heritage it bears. Hewlett-Packard is one of those old-line manufacturers of electronic components that began in the infancy of the electronic age when vacuum tubes were the "modus operandi." Starting as a small manufacturer of electronic test equipment, the company quickly grew and expanded, but always retained an engineering/scientific orientation. With the advent of the reduced-size computer, H-P grew into a position of respect as a producer of extremely high-quality engineering tools.

Excepting its line of excellent personal calculators, the company has been relatively unknown outside of the scientific community. H-P's history and orientation is important from a user standpoint, because it explains many aspects of the company's unique approach toward the packaging of a business microcomputer.

The majority of business microcomputer manufacturers deal in iron—they manufacture the machine and leave it

to others to provide the software for the machines. In some cases, such as with Vector Graphic and Osborne, the manufacturer has licensing agreements with outside software houses. It is almost unknown—with the possible exception of Commodore—for a manufacturer to provide a proprietary operating system and Basic language. (Even Radio Shack got Microsoft to design its system.) H-P, on the other hand, has taken a deviant approach. The user receives a machine that has an integrated operating system and Basic written by H-P. CP/M is also available as an option.



The HP-75 can interface with other systems—such as the HP-86—for expanded-computer power.

The 86 is part of the HP 80 series, which also includes the 87. Physically, the machines are similar-looking, with the exception of a small built-in monitor in the 87, which is more suited to engineering use than business. The 86 consists of the following components: the computer/keyboard unit, which includes about 60K bytes of useable memory, expandable to 572K; a separate monitor, either a 9-in. or 12-in. green phosphor high-resolution screen; either single or double disk drives with capacities of 286.72K each (double-sided, double-density 5.25-in.; a graphics printer with 3-color pen capability, and a private-label Epson MX-80 printer.

This system looks MIL-Spec all the way. One gets the impression that it's designed to withstand direct nuclear hit and survive. Even the interfacing cables are heavy-duty with military-type connectors on each end. The whole set-up reeks of durability.

The computer itself is an 8-bit processor of proprietary design, which has some unique features that allow it to address as much memory as a 16-bit processor. It is important to note that the user is insulated from the technicalities of this computer. The manual contains very little regarding the guts of the machine. H-P personnel, while more than happy to answer technical questions, prefer to concentrate on solving application problems. This machine was simply not intended for hardware tinkerers. All servicing is referred to H-P service centers world-wide.

Connecting things to the computer is about the only hardware-oriented procedure the average operator will be concerned with. There's a backplane with a number of slots accessible through individual .5-in. by 5-in. cut-out positions in the back cover. To add accessories, the user removes a slot's cover and plugs in the appropriate cartridge. H-P has cartridges for the CP/M system, an external ROM holder, 128K memory expansion, and an interface card, which contains the proprietary HP-IB method (ANSI IE-488 compatible). This method of connecting peripherals allows them to be daisy-chained from one interface board. Each device is given an address and the controller sends appropriate instructions to activate a device as it is addressed by the computer. It's clever and certainly off the mainstream that most microcomputer manufacturers have followed.

One of the first things a more sophisticated user wants to know is whether he can hook up his Qume or TI-810 printer to the machine. Unfortunately, this may be a bit more difficult than configuring the four-pen graphics plotter. H-P really should have provided an RS-232 connector, or at least a plug-in card, which has them. The operating system apparently doesn't have the I/O routines necessary to support RS-232 protocols. At present, hooking a Qume or other non-H-P device to the machine may be traumatic for the operator, requiring a bit of courage and enough bravado to pester H-P's service engineers until it works. Lest it sound as though such interfacing can be achieved by some obscure means, note that it is IE-488. That means that it is essentially a parallel port. H-P is certainly aware of the existence of other peripherals, and has worked out the interconnections to a few.

The documentation is heavily oriented toward programming and the support that the factory will give to the user. There's a two-inch thick manual on H-P's Basic, and a separate 70-page introductory manual. There's even a Pocket-Guide, which gives the user programming highlights in 52 pages.

This machine is oriented toward those who will probably program their own applications—or at least dabble in programming. The message is clear that H-P wishes to support program development on the machine. The company even offers a three-month free phone-in consultation service on any aspect of software or clarification of the manual. They promise to call you back with an answer within four hours. Your call will be answered by a Systems Engineer, not some high-school student filling in for a programmer. If three months isn't enough, the user can extend the support agreement for a nominal charge. H-P also offers three classes in programming. Separate classes are available for the first-time programmer, as well as for the advanced programmer seeking program optimization. For large companies with 10 or more participants, they will come to the user's facility. Prices for classes are reasonable, starting at $260.

For users interested in "plug and run," there is some very good software available, including VisiCalc, dBASE II (requiring CP/M card) and the whole line of Peachtree software (written in H-P Basic). For word processing needs, WordStar is available. In addition, there's the Series 80 user's library. A subscription costs $40 and entitles users to access a listing of all the user group programs. We didn't

Continued on page 66

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CIRCLE NO. 27 ON INQUIRY CARD

The HP-75C Portable Computer

A 32-foot ketch-rigged motor sailer swings lazily at anchor in Avalon harbor. The morning mist lifts to reveal a solitary sailor in the aft cockpit, bending over an odd contrivance on his lap: a computer keyboard connected to nothing, emitting an unmelodious cacophony of beeping sounds. The early morning game-playing would soon be superseded by a serious computing session; one involving carefully-considered compass bearings for this day's yacht race. At the moment, the tiny box probably represented the most powerful computing engine to be found within a 30 nautical mile radius of that Catalina Island seashore village. It was the HP-75C, the latest in an exploding line of personal computers built by the Corvallis, OR , division of Hewlett-Packard.

Just when one captures an understanding of the new breed of microcomputers and programmable calculators, some clever designer comes up with something new—a portable, nearly pocketable computer that's as powerful as one a hundred times its size.

In size and utility, the HP-75C fits somewhere between a programmable pocket calculator and the Osborne-class portable microcomputer. It's just large enough to contain a practical-sized typewriter keyboard, but its diminuitive dimensions invite you to hang it onto your belt for a day's business at an offshore oil rig or a weekend sailing trip.

The unit is but 10-in. wide by 5-in. high; just 1-¼-in. deep. Complete with a battery sufficient for 20 hours of operation, it weighs barely 26 ounces. With a basic price tag of $995, this handful costs $38.27 per ounce—about what Fort Knox used to pay for fine gold.

On its upper surface, the HP-75C contains a full typewriter keyboard, plus some additional special function keys—65 in all. Horizontal spacing of the keys is 5% tighter than those on a standard computer terminal. Vertically, the keys are squeezed into ⅔ the space normally found on an office typewriter. When depressed, the keys move with a barely audible click that's perceptible to the touch. They are not comparable with full-stroke keys by any stretch of the imagination, but a skilled operator can become quite proficient with this keyboard.

The visual readout is a single-line 32-character display set just above the keyboard. Each character is formed in high-contrast liquid crystal by a 5-by-9 array of dots. Lower-case characters are displayed with true descenders below the baseline, and a wide range of foreign alphabets and graphics characters are supported. The liquid-crystal display doesn't generate its own glow, thus it requires little power and becomes more readable as the ambient light gets brighter.

The single line of characters is really a window onto a much larger display space held in internal memory. Entering more than 32 characters causes the display to scroll sideways, up to a maximum of 96. Vertically, the memory can hold hundreds of program or date lines, depending upon the complexity of the entry. You push the up- and down-arrow keys to scroll the display past the single-line window. Alternatively, the company will sell you a conventional TV-style display monitor to show 16 rows of 32 characters each.

Operationally, the system has three modes: EDIT, TIME and APPT. The EDIT mode might just as well have been called Basic, as the computer acts a lot like other computers after you enter that command. A simple "|>" character invites you to enter a Basic language command, either with a line number or without one. If line number is entered, the computer treats the entry as part of a larger Basic program, to be run at a later time. Absent this number, the HP-75C will execute the command immediately.

Either way, the entered line may be fixed up with some simple editing sequences before it is sent to the processor by pushing the RTN key. Input errors are announced by the machine, and the offending line re-displayed with the cursor sitting on top of the suspect character.

Pushing the TIME key causes the display to show today's day of the week, date and time to the nearest second. The clock is as accurate as most digital watches (typically ±1.5 minutes per month), and can be calibrated even closer by simple keyboard commands. The clock/calendar is available to your Basic programs, as well.

The APPT mode is a well-conceived bonus built into every HP-75C. Appearing a lot like the TIME mode, this function allows you to enter up to 3,000 future appointments over the next 10,000 years —if you care. Appointments may be single events, or repeating alarms spaced from one minute to eight years apart.

Even when turned off, the HP-75C will sound an audible tone and display up to a 68-character note when each appointment comes due. Further, the little computer can begin to execute Basic programs in accordance to preset schedules. This feature holds some fascinating possibilities when connected to a scientific instrument or industrial control device via Hewlett-Packard's standard HP-IL interface.

The microprocessor utilized in this computer is a proprietary integrated circuit. It is a low-powered version of the chip featured in Hewlett-Packard's larger HP-86 and HP-87 desktop computers. That means they share the same language, and that software can be traded back and forth among them.

"Low power" usually equates to "slow" when it applies to digital electronic circuits. We were pleasantly surprised to see that the HP-75C was able to contradict that adage. Our standard Basic benchmark test, the Prime Number Cruncher (*IA* Aug 81) took but 1,355 seconds to run on this lap computer. That's 41% slower than Apple II+, but 41 times faster than Radio Shack's Pocket Computer.

The HP-75C contains its own mass storage hardware. An easy-to-overlook slot in a bottom corner is the visible part of a built-in magnetic tape reader. The tapes are provided as stiff strips that can be pulled through the slot by hand. Each tape is 10-in long, and holds up to 1,300 bytes of program and/or data files. You can use this to make backup copies of your programs, or to enter purchased software. Hewlett-Packard now offers a few strips containing simple financial programs—more will be available soon.

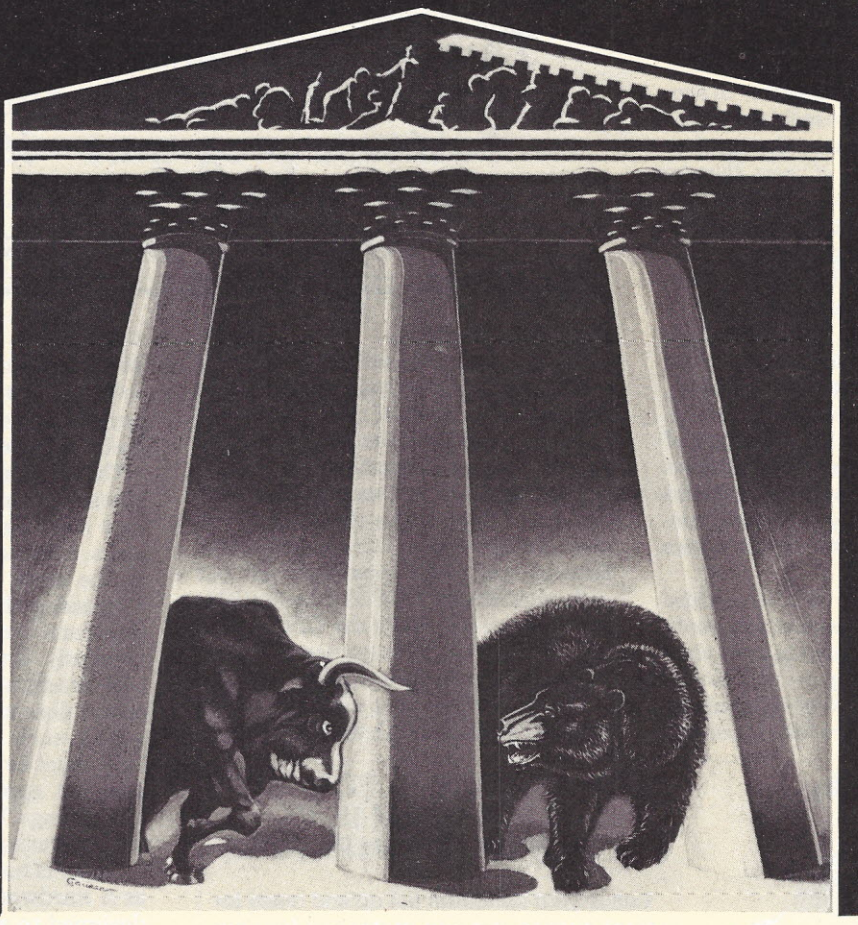
In addition, the front edge of the unit has space for three snap-in read-only memory modules. These can contain entire applications programs, each with up to 16K bytes of ready-to-run software. These slots can also be used to beef up the system's internal memory (normally 16K bytes) in 8k-byte chunks.

For such a young product, the HP-75C has an amazingly complete options list. The basic $995 unit can be enhanced with a battery-powered recorder to hold up to 128K bytes of information in pocket dictator-sized minicassettes. This costs $550. A tiny thermal printer is also available for $495. It can print 24-character lines or plot bitmapped pictures under control of a Basic program. Both of these accessories can snug with their master unit into a regulation-sized briefcase.

For large-screen displays, you need the $295 video/TV interface; possibly a 9-in. or 12-in. monitor at $295 or $325, respectively. Eight K-byte memory modules cost $195 apiece; you can use up to three at once. Interface to the HP-IL bus, larger printers, a plotter and Modem for data communications are available as well. If you aren't careful, your investment in the HP-75C can become a serious drain on the budget.

—Tom Fox

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CIRCLE NO. 9 ON INQUIRY CARD

HP-86

Continued from page 62

review the list or any of the programs, but it appeared that the intent is to support a large library of useable routines and programs. To enhance the development of a "community" of users, there're also several magazines including the "Basic Exchange" and the "Communicator." H-P intends to support its own Basic and Operating system by making users fully aware of hardware/software programming quirks and bugs. The user receives periodic bulletins regarding unusual items noted in the computer, any software packs and in interfacing. This kind of support is just short of commendable, since most manufacturers of hardware and most software vendors essentially say goodbye to their customers the minute the check clears the bank.

The manuals provided with the machine are professionally written and pleasantly formatted. They're printed in two colors on expensive coated paper—with lots of pictures and diagrams. Well-indexed and cross-referenced, they are easy to use and apparently complete.

This system lacks some features important to running sophisticated business programs—it's more suited to super-calculator type corporate analysis . . .

It is held by some that a computer cannot be considered a true business micro unless it hosts at least the CP/M or the Oasis operating system. There is some support for that contention. The amount of good business software available for CP/M and Oasis make them one of the most flexible routes. The sensibility of this capability was apparently not lost on Hewlett-Packard. CP/M 2.2 is available for the machine. Since the CPU chip is not a Z-80, the 86 must use the same route that Apple uses to run CP/M—an outboard adapter that contains a Z-80 chip and interfaces with the native operating system. The H-P system is a complete implementation of CP/M, but the user will find that it cannot operate peripheral devices other than printers and disks or perform CRT graphics.

The CP/M system provides about 56K bytes of user program space, and the user must have H-P CP/M-compatible disks. The manual for the CP/M is one of the most comprehensive available, surpassing the stock Digital Research literature by a mile. Orientation is obviously towards the programmer—with details on how to use it. The CP/M option does not include any Basic Language, such as Microsoft or CBasic. That must be purchased elsewhere. H-P does not appear to be concerned with supporting CP/M as vigorously as their own operating system.

There is no combination as effective as a hardware and software system designed to work together. When the software engineer can utilize all of the peculiarities of a particular piece of hardware, favorable things emerge. Such is the case with the proprietary H-P operating system and Basic language. They are contained in internal ROMs, so they are present upon power-up. The first thing that happens upon applying power is a brief self-test a la the IBM PC. Basic is then available to the user. No disk drive is necessary to operate the machine. They are used for data and program storage only.

Commands for the operating system and Basic are really all one in the same. The system has 14 special function keys. Some of the most common commands are accessed in that fashion. These keys can also be reprogrammed to user-defined functions, and H-P includes two keyboard overlays—one with standard function assignments and one with blank definitions for programmer use.

As any experienced programmer is fully aware, there is considerable variation among different Basic dialects. The H-P dialect features an easy-to-use screen editing, which includes cursor control and editing keys for replacing, inserting and deleting anywhere on the screen. This is

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based on four variable types: simple numeric, simple string, numeric array and string array. Arrays can be single or double dimensional. There are three precisions: integer, short and real (full 16 digits). Multicharacter line labels allow programmers to reference program lines by name and branch to them by name. Also incorporated are a tracing debugging aid and capacity for variable names up to 31 characters long. A complete, sophisticated hi-res graphics system is included within the Basic language. It offers scaling, plotting and labeling statements. Definition of functions within a program is similar to the building procedures in Pascal. The user has control over the size of the CRT display, with capability to define either 16 or 24 lines of 80 characters.

The engineering orientation of the system language is evident from the available functions: Maximum; Remainder; Logarithm (base 10); Minimum; Random #; Logarithm (base e); Anti-log; Gradients; Radians; Degrees; Sine; Arcsine; Cosine; Arccosine; Tangent; Arctangent; Cosecant; Secant; Cotangent; Time; Degrees to radians; Date; Integer; Radians to Degrees; Absolute Val; Fractional Val; Floor Val; Ceiling Val and Randomize. This list of functions is extensive and exceeds the capabilities of most dialects of basics found on micros. From an engineer's standpoint, these functions are necessary and to be expected. However, the business user will have little—if any—use for most of them.

Realistically, H-P's implementation of Basic is not the best for all-around business use. The businessman needs a programming language that contains the following essential features.

Data manipulation (extensive string capabilities), from an engineering standpoint, is included, but business users need additional capabilities, such as special routines for handling dates, dollars, etc.

Sorting functions (either built into the language or available as an easily added utility), are accomplished by many professional packages that are written in assembly language for CP/M. Perish the thought of having to sort a large database in Basic!

Sophisticated data file structures (ISAM or B-tree) are included in almost every effective business package. Most databases worth purchasing have sophisticated code for handling data in files. Attempting to implement this same level of sophistication and speed starting from scratch in H-P's system would stretch the skills of all but the most experienced programmers.

Report-oriented print routines are also important. Business users need the capabilities to present dollars in the right format, with justification and rounding, plus the ability to toggle pagination, etc.

It is in these critical areas in which H-P's Basic is less than what would be hoped for. While the H-P system has some excellent features—particularly in the graphics area—it's a shame the system doesn't have more of the features that are important to implementing sophisticated business programs. One gets the impression that the H-P engineers did not design the machine and its software to be used as a general-purpose business micro. They really didn't expect to see users putting general ledger or payroll on the system. Instead, it appears as if they envisioned the purchasers as using the machine as a sophisticated super-calculator and analysis tool—perhaps placed on the desktop of a large corporation executive.

In the case of a strictly CP/M machine, the absence of many of these features is largely overcome by the presence of many excellent software packages. However, for the H-P system, pre-packaged software availability does not seem to be one of the major selling points. With a CP/M-only machine, vendors can sell lots of really sophisticated report and program generator type programs. It's too bad that H-P's Basic and operating system don't include such tools built-in. While it is possible to switch to the CP/M mode to use all of the wonderful CP/M software available, one of the marketing philosophies that H-P has chosen is to offer everything as a bundled package—hardware and operating system. Another alternative the user had is to obtain some of the necessary software through the H-P users group. The company assures me that machine language sorting programs are available through the group, and that routines for accomplishing some of the formatting and printing routines are similarly available. B-tree and ISAM are not currently available, though.



The HP-7470 graphics plotter is among many devices that will work the HP-75 unit.

The acid test of a system review is to ask the reviewer whether he would purchase the machine. Answer: it's tempting. If the user has any propensity toward programming and wants to get into the micro field at the high-end of the quality market, the answer is yes. There's a lot of virgin territory for a good programmer to create absolutely fantastic business programs using the tools that the H-P offers—particularly in the graphic presentation area. There's also the secure feeling that in cases of trouble, there's someone you can call and get help from. And then there are the prices, which allow a user to get started with the machine for $1,795 (without disk or monitor). A fully-loaded, CP/M system will cost about $4,000, which is about where the competition is. It's a good machine from a quality-oriented company and should be given careful consideration in the selection process. □

—Carl Heintz

Corvus Concept

by Tom Fox

The Corvus Concept system boasts ideas so new they could have easily popped onto the earth from some alien laboratory.

The first hour spent with the Corvus Concept can be a disconcerting one. This new microcomputer is so new, incorporating so many strange ideas, that even experienced computerists can become befuddled about what's going on inside its enigmatic exterior. Those who trouble to make friends with the Concept, however, are rewarded by one of the cleverest, most capable tools available in today's microcomputing market.

The ideas behind the Concept, its appearance, and particularly the operating procedures it demands, are so new they could easily have popped onto the earth from some alien laboratory. On the contrary, the unit was designed within the walls of the Corvus Systems factory (San Jose, CA) by a small group of people whose mission was held a close secret. From this clandestine effort emerged a machine that's not even *called* a computer, it's termed a Personal Workstation.



The Personal Workstation's flexible display can accommodate up to 17 sub-screens.

The idea of a computerized workstation fits hand in glove with another important Corvus product, the Omninet local area network. Omninet provides the means for interconnecting a collection of individual microcomputers into an integrated, powerful information utility that shares a common database. Until the Concept, computers thus interconnected bore the names Apple, Radio Shack, IBM PC and the like. Corvus' own workstation brings considerably more sophistication to the party. Those really up-to-date in computer happenings call the Concept a Pocket Star, referring to the trailblazing—but barely known—state-of-the-art Xerox workstation/computer.

By the Corvus definition, a personal workstation is a video display screen and keyboard backed up by a stand-alone microprocessor computer complete with its own random-access memory (RAM) storage. The workstation includes the means to tap onto a local area network, and the right kind of software to perform on its own the tasks put to it by its operator. Such a machine is dependent upon the network for two things only: communication with other users on the network and all of its mass data storage requirements.

The above paragraph defines an almost-computer—a processor with all the elements and capabilities of a stand-alone desktop computer—but lacking one essential element: mass data storage. The simple addition of a disk drive can remove the "almost," and transform the Concept into a true, stand-alone business computer. As an important supplier of disk drives for other micros, it was a simple matter for Corvus to supply that missing link to purchasers of their new product. The version we tested had both a 6M-byte Winchester and 8-in. floppy disk drive attached.

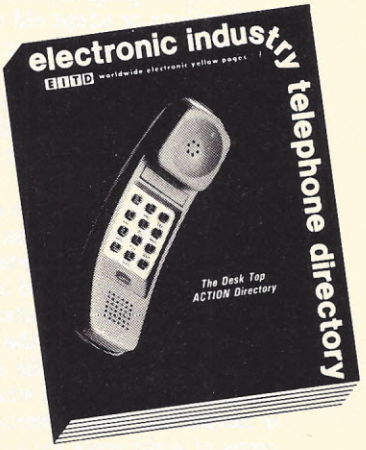
Turn on a Concept, and you're faced with a screen unlike any other to be found in the computer store. For openers, the black-and-white cathode-ray tube may be placed in the normal horizontal position, or tipped up 90° like some of the really expensive word processing terminals. Laid down, the screen can display up to 48 rows of 120 characters each. Standing up, as many as 64 rows of 91 characters each can be accommodated. Either way, that's about 5,800 characters—about three times normal for today's computing hardware.

Actually, the screen can hold even more information than even that total, but this space is held aside for special Concept functions. For example, there's a row of 10 rectangular boxes along the bottom of the screen that correspond to ten large special keys arrayed at top of the keyboard. Within the screen boxes are little two-line legends telling you what will happen if you push the accompanying key.

Push the key under ListVol, for example, and the screen will display a directory of the files on the disk. Depress LogiCalc, and the optional spreadsheet planning program will load and execute. Hold down the COMMAND key, and the ten key legends will flip to alternate meanings, doubling the number of available commands. They can double yet again by

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pushing the SHIFT and/or COMMAND keys in combination.

Pushing certain of these special keys will bring up another set of labels, drastically transforming the immediate meaning of the function keys. A little exploration reveals a logical hierarchy of command functions. Moving from one set to the other is a lot like using the menus in a complex accounting program. The top layer of functions is called the "dispatcher level." Pushing FileMgr brings up the "file manager level," used for such functions as copying and erasing disk files. There are at least five other levels, each with from a few to dozens of sub-functions.

Beyond this, the applications programs provided by Corvus also make extensive use of the function keys and their soft labels. Additionally, information is given to allow independent software developers to follow the same enlightened path.

More than just a clever gimmick, the operation of the special function keys embodies a philosophy of operation that is one of the key ideas that sets the Concept apart. Instead of typing memorized commands into the keyboard, you can sit through long sessions, directing the computer through complex operational scenarios by depressing a remarkably small number of keys in an ordered sequence. A strange and awkward way of doing things at first, you soon find your fingers tracing their own paths through complicated command sequences without requiring a lot of mental supervision. When you become expert, you will find yourself taking full advantage of the almost unlimited type-ahead capabilities of the keyboard buffer.



In the horizontal position, the screen can show 48 rows of 120 characters.

The Concept's screen has another dramatic trick up its sleeve: windows. Windows are areas that can be defined by the user as sub-screens—small patches that act as if they were independent terminals controlled by the master computer. You can define up to 17 windows on Concept's large display, and make them the rectangular size and shape you wish. Each window can be independently scrolled or paged to your bidding. Each can be displayed in white-on-black or the reverse. Each can be used to capture a computing session with a distinct and independent task.

For example, a word processing session in one area can be suspended (frozen in one window) to perform an auxiliary calculation in the spreadsheet analytic program. The only thing the Concept won't do (yet) is allow tasks to run in several windows at the same time.

Another (entirely unexpected) feature of the Concept is the ability to alter the type font utilized on the screen. Such alteration can be performed by the user with a clever set of fun-to-use commands reminiscent of a computerized Etch-a-Sketch toy. There's no need to stick with the traditional English, French or even Greek alphabets—you can make up your own if you wish on the 16-by-16 dot canvas provided for each character. In addition, the high-resolution video display invites the more adventurous to create graphics pictures with this unique tool.

Each of the 17 windows separately defined can be set to utilize a *different* type font, if desired. This could make for some interesting screen displays.

One of the prices paid by pathfinders in the computing game is that although the processor may be clever beyond words, the business world will not be able to actually *use* the machine until someone comes up with applications software to do what computers do best: manipulate words, crunch numbers and solve real-world problems. Corvus has tackled this dilemma on two fronts. First, the company has provided the software tools necessary for programmers to invent new applications or adapt old ones. Second, two of the company's own finished programs have been included: a word processor and a financial analysis program. Both have been created with imagination to make full use of the best of the distinctive Concept features.

LogiCalc, for example, is a VisiCalc-like financial planner that can take full advantage of the .5M-byte (maximum) memory capacity offered in this computer. The program is rendered far easier to manage by allowing the display of up to 418 10-character cells at once in an 11-by-38 array. That's when the screen is horizontal. Placed vertically, 54 columns of eight rows each can be shown at once, for a total of 432 cells.

The Edword word processing program can show the full text of a standard 8-½-in. by 11-in. sheet of paper without scrolling to additional screens. In addition, tiny visual indicators tell you where you are in your document with little thermometer-style pointer guides. The special function keys are utilized fully to handle word processing directives such as inserting words and lines, making blocks of text, etc. In fact, the alphanumeric keys are utilized almost exclusively to enter text into the document. That's how keyboards work on typewriters, and that's how they were intended to work. Much of the difficulty in learning to use word processors can be traced to the unnaturalness of sharing keystrokes between the chores of entering text and commanding special word processing functions. The Concept outflanks this problem by use of its 10 special function keys.

In other software areas, the Concept offers the applications programmer a friendly, productive working environment. The operating system is Pascal-based, and integrates best with programs written in that structured language. Fortran is available for the more scientific chores, but Basic, oddly enough, has been forgotten. It's hard to imagine a new microcomputer becoming a success in today's Basic-saturated market without that fundamental and overwhelmingly successful language.

The hardware side of the Concept workstation offers as many fresh ideas as the software developments discussed above. The main microprocessor is the extremely powerful Motorola-designed MC68000 integrated circuit chip. This device

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combines the features of a 16- and 32-bit processor, and runs at computing speeds unheard of in the more ordinary 8-bit chips. In the Concept, all of this power is needed sorely, since the single 68000 is burdened with managing every million-plus dot position on the screen display in real time. Simpler computers delegate much of the character display task to dedicated character generator circuits. The Concept's multi-type font and user-defined windowing capabilities, however, must be served by raw computing power.

The main computing box is actually a base for the swivel-mounted display screen. The base measures 17-in. wide by 15½-in. deep, and sits just 4½-in. high. Like the other Corvus components, its housing is molded from a thick, fiber-reinforced plastic compound. About two-thirds of the interior is taken up by a sliding drawer that contains nearly all of this system's electronic components. The drawer is a sandwich of two large four-layer circuit boards. The largest measures 9½-in. by 13½-in., and contains all but the main memory and screen display electronics.

The second board is simpler in function and includes an array of 32 65K-bit dynamic memory chips that form the 256K-byte RAM. An equal number of empty sockets await the inclusion of additional RAM to bring the computer up to its maximum .5M-byte capacity.

Near the rear of the main circuit board are four familiar-looking connectors. These are identical in function to similar ones in the Apple II, and allow the connection of external peripheral devices. This is how the local disk storage is accomplished, and how a host of special functions can be implemented with Apple-compatible hardware.

The display unit is a massive, nearly cubical unit that houses a 15-in. (diagonal measure) black and white cathode-ray tube. The tube and its supporting circuitry are wide bandwith design, required for the high-resolution information generated by the Concept's software programs. The display unit carries its own internal power supply, which accounts for a good fraction of the box's mass and requires that a separate AC power cable be routed to it.

The Concept's keyboard resides in a movable 8-in. by 17-in. module in concert with the current vogue. Ninety-one keys are provided, including the ten multi-talented special function keys described above. Each key incorporates IBM's much-copied Typamatic function, which allows a character to repeat continuously when a key is held down for more than a half-second or so. The expanse of the Concept screen is so vast, however, that it can take a long time to move the cursor around on its surface. To ease this problem, Corvus engineers were kind enough to include a FAST key that boosts the Typamatic function into overdrive.

User documentation for the Concept is supplied in a collection of luxuriously padded mini-binders. Illustrations are generous, and quick-reference cards are supplied for most major software modules. We would complain about the depth of detail provided in the manuals, but a peek at some preliminary volumes suggest that this problem is being corrected at the factory.

The basic Concept workstation equipped with 256K bytes of memory will cost $4,995. The hardware in this package includes the processor box, display screen and keyboard. It also includes the electronic circuitry necessary to connect the Concept to an Omninet local area network. The price also includes the operating system, Pascal language, 68000 compiler and a host of programmer utilities (even the type font designer). If you need the 512K-byte memory option, add $1,000.

To transform a Concept into a stand-alone computer, a disk drive is needed. The minimum configuration is the single 8-in. floppy disk drive, listing for $1,500. More appropriate to the capabilities of the Concept is one of Corvus' Winchester-technology hard disk drives. A 6M-byte version like the one we tested will cost $3,195; a wide range of similar devices is offered.

When a non-removable disk like the Winchester is installed, there must be some provision for backing up the data, and for transporting information between the Concept and other computers. This function can be served by the floppy disk just mentioned, or by the Mirror. The latter is a clever Corvus invention that allows you to copy disk data onto a low-cost video cassette recorder.

Available software includes the Edword word processing program at $495 and the LogiCalc electronic spreadsheet for $250. A Fortran compiler will cost $200, and really works best if the 512K-byte memory option has been selected as well. Significantly, the catalog does not list a Basic language interpreter or compiler. Corvus expects to fill this need with the CP/M Emulator, a $295 software package that was too new for us to evaluate by press time.□

Technical Editor Tom Fox has authored over 50 articles and editorials for IA *since May, 1979. He has spent his entire 21-year career in the field of electronics; with the last 14 years devoted to computer systems and their application to business and industry.*

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A Collection of Programs for Expanded Memory Systems

by Mike Heck

Commodore systems can now accommodate some highly sophisticated business software packages.

A number of specialized programs are available that take advantage of Commodore's 64K-byte memory expansion board for Pet and CBM systems. This board increases the maximum RAM available on current Commodore computers to 96K.

It may be fitted to either a Commodore CBM 8032 or Pet 4032 computer. It is designed to fit conveniently inside either machine and is attached through three cables. Besides two power connections, a cable runs from the 6502 microprocessor socket on the main board to the expansion board. A 6502B is included on the expansion board to handle processing for both systems.

The extra memory is addressed as 4-16K banks. Normal Basic can't use the extra RAM without the help of a "memory manager." Limited software is included as part of a development and test disk supplied with the hardware. With some time and ingenuity, you could easily have several programs, or parts of them residing in memory at any time. This eliminates the need to constantly use the disk to bring in other program segments and speeds program execution significantly. That is exactly what a number of software developers have done to enhance certain applications and design new packages that were not possible before.



Commodore Pet 4032 System

Commodore 8032 System

Wordcraft 96 and Ultra

Wordcraft ("Commodore Logbook" *IA* Aug 81) has undergone major changes over the past year—the most significant being upgrade capability to run with the extended memory. Wordcraft is unique in that it is one of the true screen-oriented word processors available. It shows text in the exact form that it will be printed. Format controls are embedded within the text rather than on separate lines, but can be easily seen and modified with a single control command. In addition, when text is edited or format changed, the effect is seen instantly on the screen. The penalty for this was the necessity to break the program down into separate modules to provide adequate memory to hold text.

With 96K bytes to work with, all the various modules are held in memory, while still providing over 24K for text. The underlying benefit is faster execution and several additional features. Perhaps the most obvious upgrade is communication capability. By just attaching an IEEE-488 modem, users can transmit text to any other Wordcraft 96 system using a simple command. With the document in memory on the sending machine, the user establishes communications and types "s,1" while at the receiving machine the user enters "g,1". Text is sent in small packets. If part is not received properly, only the section in question needs to be re-transmitted. The transmission technique is CRC (Cyclic Redundancy Checking), which is a very reliable protocol used by mainframe systems to provide highly accurate data transfer.

Several other enhancements have been provided in the latest versions of Wordcraft—such as reversing text marked for deletion and some internal changes to the way control codes are handled. The most radical changes are apparent in the latest release of the package, called Wordcraft Ultra. The few shortcomings Wordcraft exhibited have finally been eliminated. The most serious was the inability to mix line spacing within a document. It was either single-or double-spacing.

To provide many of the new features, the ESCAPE functions of most letter-quality printers are employed. These send a sequence of special codes directly to the printer, and

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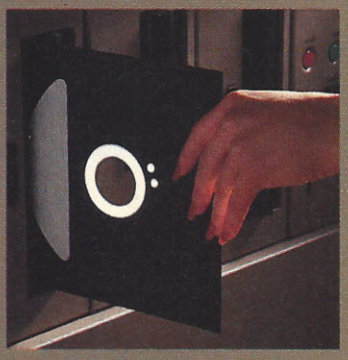
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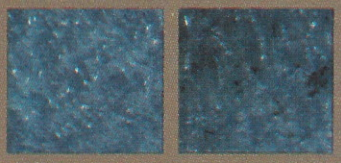
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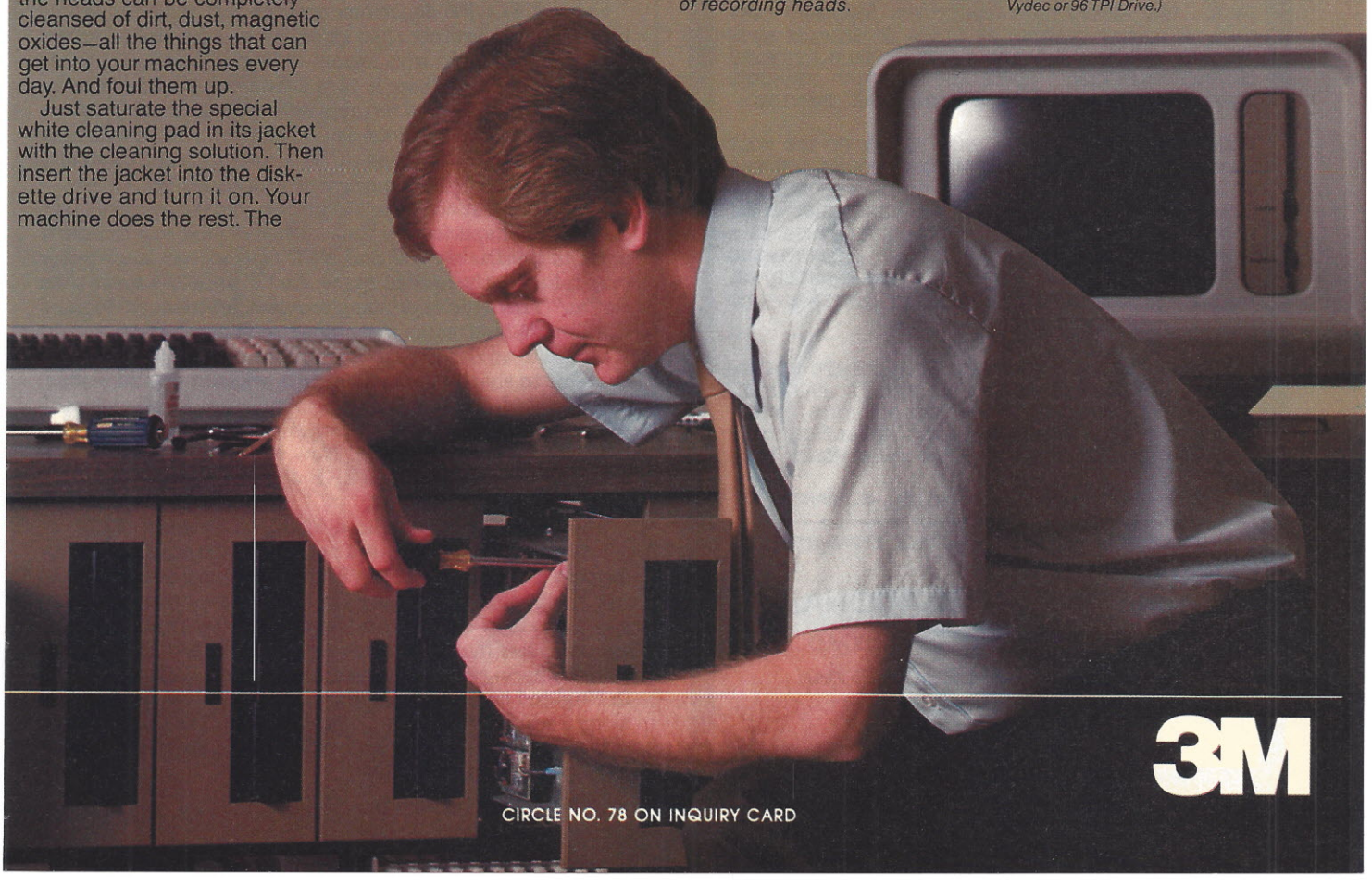


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the printer then performs the desired function. To handle a variety of printers, special table-driven printer routines have been written. What this really means is that the differences between printers have been reduced to a special table of values loaded into the program at start-up. These enable new printers to be added without program changes. Changes to existing printers can be made with ease. The program operates the same—no matter which printer is employed.

To select various line spacings, you would type ESCAPE-D, for double, ESCAPE-M, to increase it by an additional factor. Likewise pitch can be varied within a line with other ESCAPE codes. Another problem was mixing boldface and underlining within a document. Again, you had a choice of either. Now, both can be used together—or at different places within the same document.

New printers can be added without program changes. It operates the same—no matter which printer is employed.

Other ESCAPE functions provide for centering whole blocks of text—rather than single lines—and also selecting ragged left or right text format. A big advantage of these ESCAPE code facilities is that they can be used in header and trailer text as well as main text. For example, shadow-printed, centered headers can be printed with a different horizontal pitch from the text. The communication capability has been kept from the original Wordcraft 96 release.

The best is yet to come: the printer routines support true proportional spacing on those printers that can handle it such as the Diablo 630 and NEC Spinwriter. Each letter only takes up the needed space. An "i" uses less space than an "m." This type of printing provides professional-looking documents that come very close to typesetting.

Added to all this are special routines that allow up to eight systems to share a disk and printer without any additional interfacing. Normally this would require an additional hardware unit to lock out all the other machines while one was using the disk or printing. Now all eight can be "daisy-chained" together on the IEEE-488 bus with the software doing the supervision.

This is called a Tokenized Multiple System—TMS. In essence, a "token" is passed between the machines and the current holder of the token is the only machine allowed to use the bus. It must offer the token to all others during any periods in which it no longer needs it. This technique provides an effective way to set up a local network of computers sharing peripheral resources. Wordcraft originated in England and was written by Peter Dowson. Earlier versions were distributed by Commodore, but the latest version is being distributed and supported by Computer Marketing Services (Cherry Hill, NJ).

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WordPro 5 Plus

The WordPro series of word processing programs from Professional Software (Needham, MA) were the first packages to run on Commodore systems, dating back to the original Pet. They have undergone constant refinement, and now there are versions that run on all Pet and CBM models. WordPro 4 Plus is a product for CBM 8032 models, and WordPro 5 Plus is an enhanced version for the upgraded system.

Unlike Wordcraft, all versions of WordPro load the entire program into memory at one time. This leaves only a small amount of memory for text (about 116 lines or two pages). WordPro 5 Plus increases this to over 900 lines. To a user, this means that you don't have to be concerned with constantly saving small sections of text to disk and connecting one segment to the next. Since WordPro doesn't immediately show text in finished format on the screen, being able to work with more text without interruption makes editing much easier.

In previous versions, a small area of memory was set aside for moving blocks of text and other functions. This has been increased. Other features that make WordPro popular have been retained—such as math functions for adding columns, mixing pitch and spacing and supporting various printers.

U.C.S.D. Pascal

For serious development work, the Pascal language must be considered, because programs can be easily moved from one system to another. Using the 64K upgrade, SoftTech (San Diego, CA) has implemented U.C.S.D. Pascal IV.0 on the Commodore line. Programs written with the p-System on other computers will run on the Commodore line, and programs written on Commodore equipment will execute without modification on other systems running the same version of Pascal.

To those familiar with Pascal, the Commodore operation will be identical to other implementations, with the added memory holding the various necessary program segments. With the large storage capacity of CBM disk drives, this implementation provides a good development atmosphere.

System-96

Dataview (the company in England that markets and distributes Wordcraft) also has a development system for the 64K board. This memory manager handles all the housekeeping, leaving the user alone to write actual applications.

When an extra bank of memory is required, System-96 brings in that bank and it also handles disk access. The system operates as if there were unlimited RAM, using the disk as on-line memory. These features are important because the documentation and utilities included with the 64K-byte board are somewhat weak for experienced users doing development work.

Continued on page 82

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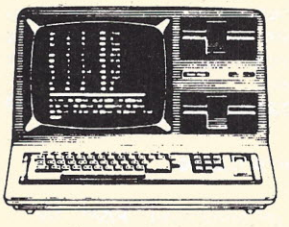
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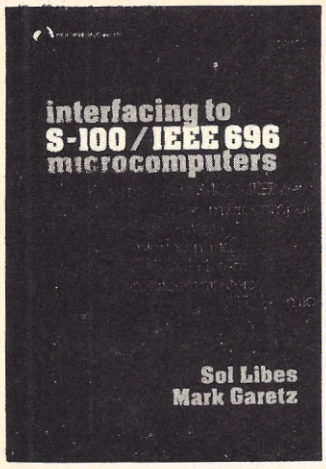
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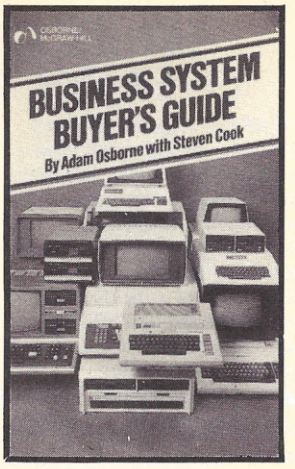
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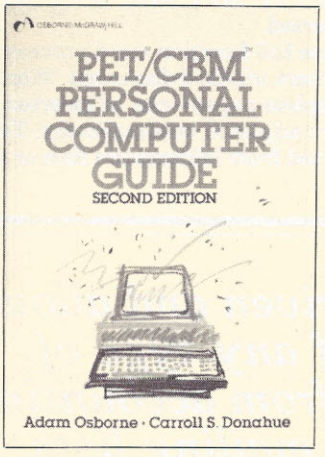
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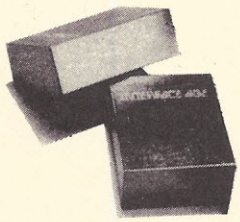
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CIRCLE NO. 10 ON INQUIRY CARD

Expanded Memory
Continued from page 79

Silicon Office

Another English firm, Bristol Software Factory, has combined a number of office functions into one package utilizing the added memory now available. Silicon Office allows you to create customized systems through simple instructions, without any programming knowledge. The program is menu-driven and allows storage of any type of information from accounting records to mailing lists. It can handle calculations, information retrieval, word processing and report formats.

Once the information is entered, it can be called upon and manipulated in a variety of ways. Up to six files may be open at any time, so you could search through any number of different lists for common information.

Calculations can be as simple or complex as the task requires. One can use plain English (INVOICE TOTAL = TOTAL AMOUNT + SALES TAX) or mathematical expressions (Y = SIN(A) * T+H−G*.5*T). Precision is to 14 digits. Functions include INT, SGN, ABS, MAX, MIN, trigonometric, date and period.

Included is a simple-to-use full-function word processor. Text can be amended anywhere within a document. Words, paragraphs—and even complete pages—can be inserted or deleted. All other pages are adjusted automatically. Text or calculations can be inserted from information files or via

It is menu-driven and allows storage of any type of information from accounting records to mailing lists. It can handle calculations, information retrieval, word processing and report formats.

calculations. The length of the document is almost virtual, until the disk is completely full.

Silicon Office also contains built-in communication functions. A telex-like mode sends messages between systems. In addition, information or word processing files can be transmitted for printing or stored and further processed at remote locations.

Silicon Office is well-documented with sample screen illustrations for each operation. A training guide serves as a quick reference to all functions. It is also available from Computer Marketing Services (Cherry Hill, NJ).

Mike Heck has been involved with the computer industry for 15 years, having worked for both mainframe and microcomputer manufacturers. He was one of the founders of the Philadelphia Apple Users Club. Mike recently wrote the user manual for the Commodore-64 and also serves as a test site operator for a number of manufacturers.

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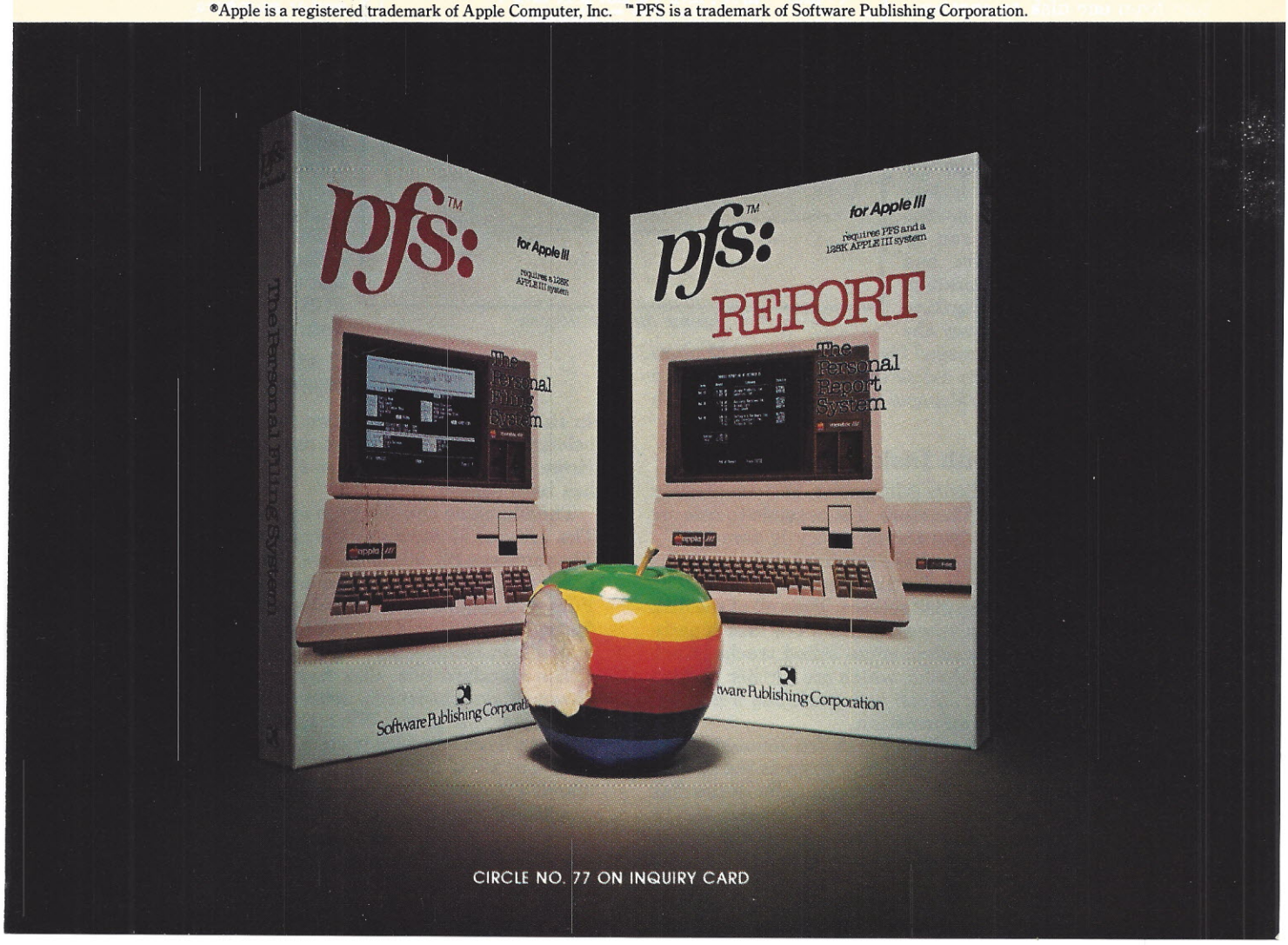
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Disk Fix

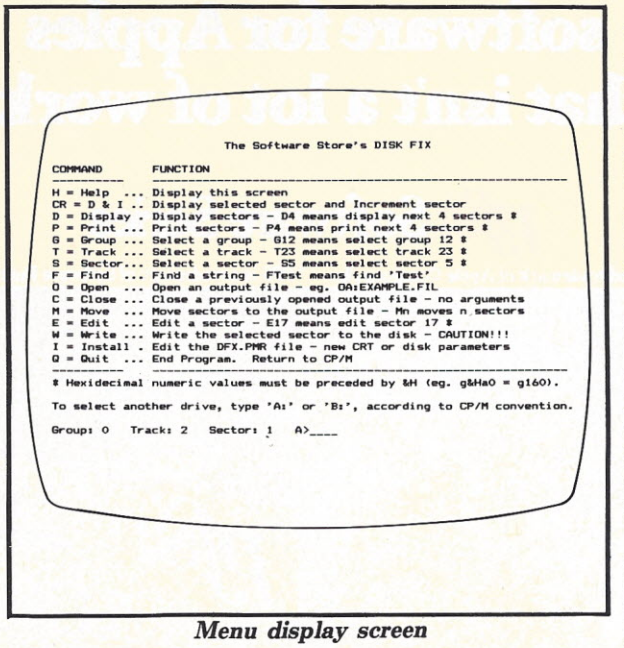
A Disk Repair Utility for CP/M

by Alan R. Miller

If a microcomputer is used for business or engineering applications, one needs a collection of utility programs in addition to regular application programs. The Disk Fix program provides a useful file recovery function.

Several programs are provided with the CP/M operating system. For example, PIP is used to duplicate individual files, COPY is used to duplicate entire disks, FORMAT initializes new disks, STAT gives the status of files on a disk, DUMP displays binary files, and SYSGEN copies the CP/M system from one disk to another.

Other utility programs can be purchased separately. For example, Microshell (*IA* Jul 82) provides Unix-like features such as redirection of printer output to a disk file. Reclaim (*IA* Feb 81) and Badlim (*IA* Jun 82) automatically find and isolate defective disk sectors, so the remainder of the disk can be used. However, Reclaim and Badlim cannot be run if the disk directory is damaged. Furthermore, they cannot recover the undamaged parts of a damaged file. Filefix (Digital Marketing, Walnut Creek, CA) is a disk utility that can undelete accidently-erased files by filename—but it cannot work with a damaged directory.



Menu display screen

New possibilities with Disk Fix

Disk Fix from Software Store (Marquette, MI) can directly alter any byte on a disk. Therefore, it is possible to recover data from a disk even when the directory is damaged.

The surface of both floppy disks and hard disks contains a coating that is magnetized with a recording head. The head moves radially as the disk rotates. Thus all of the disk surface is accessible to the recording head. The disk is partitioned into a set of concentric rings called tracks. Each track is subdivided into blocks, which are further divided into sectors. Each sector, block and track has a number for indexing the stored information.

The first few tracks of a floppy disk are devoted to the CP/M operating system. This region, known as the system tracks, is normally inaccessible. The remainder of the disk contains the data area where user programs are stored. The first few blocks of the data area are allocated to a directory of the files stored on the remainder of the disk.

Hard disks are usually configured a little differently from floppies. There may be no system tracks, so the directory begins with the first track. Another possibility is that a large disk may be partitioned into several "logical" CP/M disks. Each logical disk will have its own directory and set of track, block, and sector numbers.

Each time a file is saved on a disk, a 32-byte file control block (FCB) is written into the directory. The first 16 bytes of the FCB give the name and size of the file. The remaining 16 bytes show the location of the file on the disk by listing the block numbers.

The FCB will have a slightly different form from one disk format to another. For example, the FCB for an 8-in. single density disk might look like this:

```
00 BIOSREV ASM 00000055
02030405060708090A0B0C0000000000
```

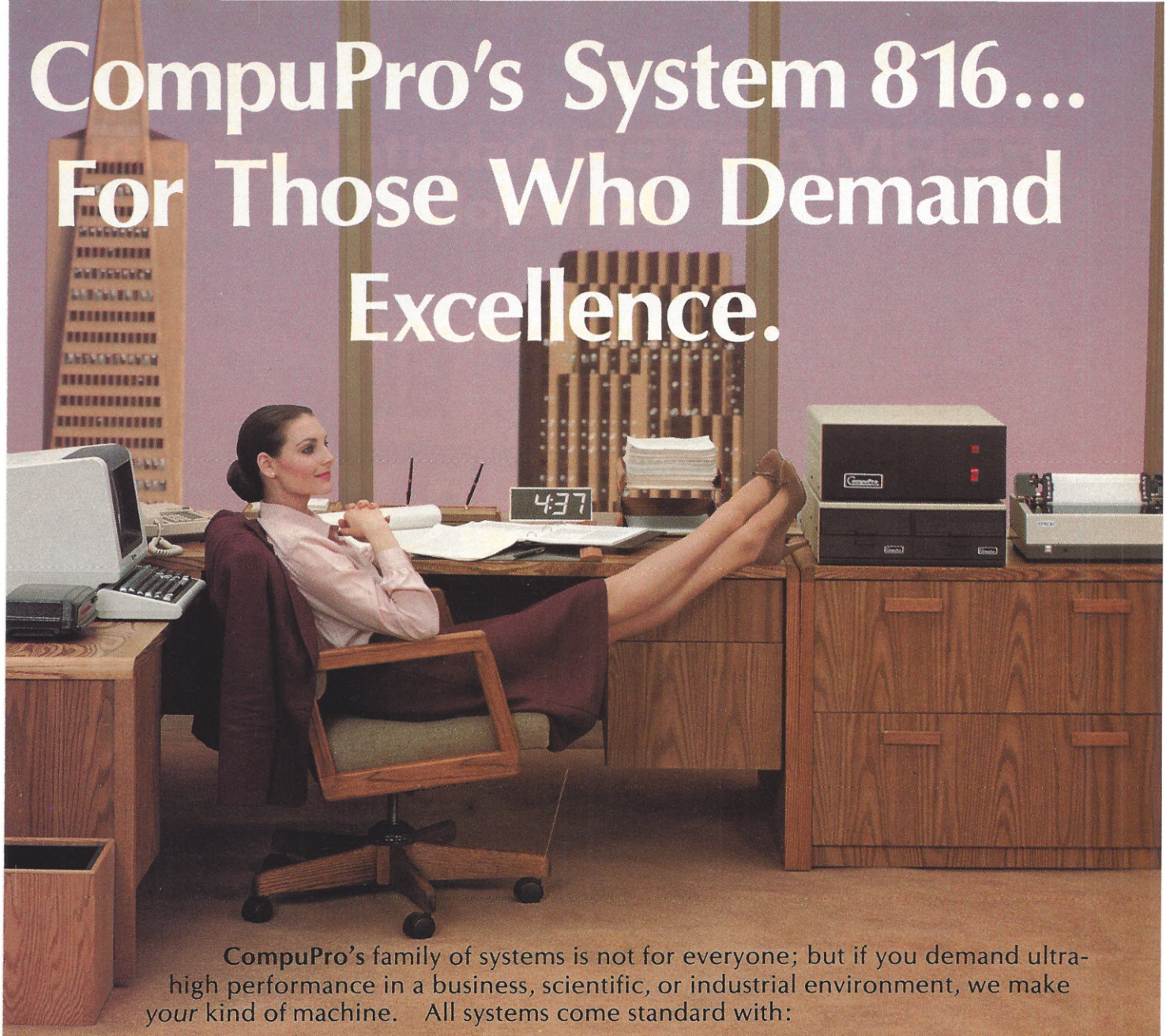
In this example, the first two zeros indicate that the file belongs to user zero. (User numbers run from 0 to 15.) However, this first byte has a value of E5 hex if the file has been erased.

The file name and file type appear in the next 11 bytes. The value of 55 indicates the number of 128-byte records. The numbers 02, 03, to 0C are the block numbers of each portion of the file. All of the information is coded into the FCB as a sequence of bits. However, in this example, the file name is displayed in ASCII, while the other information is given in hexadecimal notation.

The standard 8-in. disk has a block size of 1K bytes. However, double-density disks may have block sizes of 2K, 4K, 8K or 16K bytes. When the block size is larger, large files can be stored with fewer blocks. However, more space is wasted when files are small. For example, if the file shown above was saved on a disk with a 2K block size, the FCB would look like this:

```
00 BIOSREV ASM 00000055 02030405060000000000000000000000
```

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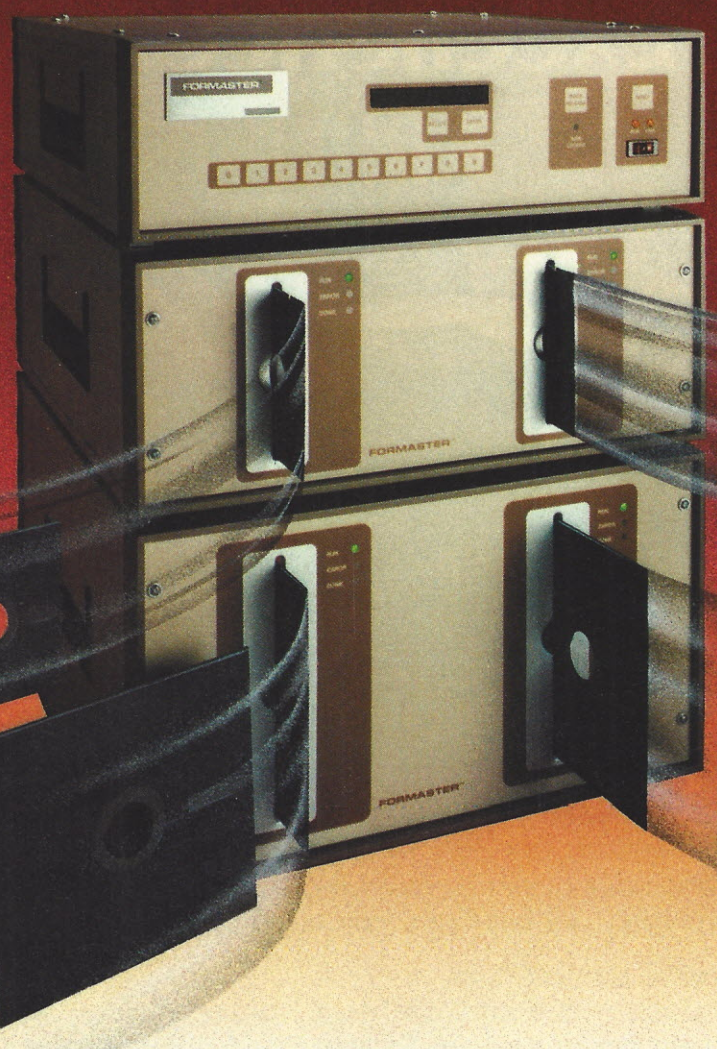
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CIRCLE NO. 96 ON INQUIRY CARD

In this case, there are still 55 records, but now only 5 blocks are needed for the file.

Each CP/M sector contains 128 bytes of information. In addition, a cyclical redundancy check (CRC) is coded along with the sector to ensure the integrity of the data. As each sector is read, the contents are checked against the CRC value. If there is a discrepancy, CP/M issues the error message:

BDOS ERROR ON B: BAD SECTOR

and terminates the task. If the bad sector is located in the data area, it may be possible to recover much of the information by using programs such as PIP and DDT. However, if the bad sector is located in the directory area, these programs cannot be used.

Each sector of the directory contains a maximum of 4 FCBs. Consequently, a bad sector in the directory area will only affect a maximum of four directories. We have seen that Badlim Reclaim can isolate bad sectors so the remainder of the disk can be used. However, the bad sector must be located in the program storage area. These two programs cannot be used if the bad sector is in the directory area. Under these conditions, Disk Fix may be able to help.

Disk Fix is a powerful disk utility that runs under CP/M ver. 2.0 or later. The characteristics of each disk are coded into the BIOS disk parameter block (DPB). Any program can determine the DPB for the current disk by performing BDOS function 31. The disk parameters cannot be determined so easily for CP/M version 1.4. Consequently, if you want to run Disk Fix on this earlier version, you have to place four of the disk parameters into a configuration file. These are:

Symbol	Explanation
SPT	Sectors per track
DSB	Sectors per block
DSM	Blocks per disk
OFF	Track offset

The sector skewing table must also be given. If you don't know what these terms are, you will want to find someone else for this step (or convert your CP/M to Version 2.0).

Disk Fix uses direct cursor addressing for sector alteration. Consequently, the characteristics of your video terminal must be placed into a configuration file. The parameters include:

1) The sequence of bytes to clear the screen
2) The bytes that load the cursor
3) The row and column offset
4) Byte to exit the edit mode (usually ESC)
5) Cursor left
6) Cursor right
7) Cursor up
8) Cursor down
9) Flag byte for setting three more items:
   a) first sector number (0 or 1)
   b) whether to display disk parameters
   c) the order of cursor load (row/column).

All of the above items are entered as ASCII-coded decimal numbers and are separated by commas. Therefore, the configuration file can be created with a CP/M text editor. To make the task easier, configuration files are provided for all of the common video terminals. If your terminal is included, it is only necessary to rename the proper configuration file to DFX.PRM.

Disk Fix with its configuration file must be on the default drive. When it is executed, the menu pictured here is displayed. You can then change to another disk by entering the drive name and a colon.

Disk Fix initially chooses the track and sector corresponding to the beginning of the disk directory rather than the system track. If you enter a carriage return at this point,

one sector containing the first four FCBs of the directory is displayed. The sector is displayed on the video screen in both hexadecimal and ASCII notation. The format is like DDT.

Each successive sector is displayed by pressing the carriage return. On the other hand, the current sector can be redisplayed by giving the command D. More than one sector can be displayed by including a parameter. For example, D3 displays the next 3 sectors. The sector number is automatically incremented up to the last sector in the track. Then the track number is automatically incremented and the sector number is reset.

A different track and sector number can be chosen with the T and S commands. Alternatively, the desired sector can be selected by designating the block number, sometimes called a group number. The G command is used in this case. This is a useful technique when you are referencing an FCB, since the block numbers are given.

The currently displayed sector can be edited with the E command. The cursor is moved to the desired place using the four cursor control keys. Then the new information is written over the original. When all of the changes have been made, the escape key is pressed to exit the edit mode. The disk has not actually been altered yet. It is necessary to give the W command to write the changed sector back to the disk.

Teach/M used as sample

The edit feature of Disk Fix was used to alter a commercial product—Teach/M (*IA* Sep 82). The version available for review was written for the Xerox 820 computer. Since it was run on a North Star Horizon, we wanted to change several table headings. However, the Teach/M files contain ASCII headings mixed with binary data. Consequently, a text editor would not be suitable. On the other hand, the files are too large to fit into memory, so they cannot be altered with DDT.

. . . this is a powerful program, but it requires a thorough knowledge of CP/M file structure . . .

The global search command of Disk Fix is the perfect solution. The F command followed by a literal string will search the entire disk for the string. When the corresponding sector is found, it can be edited, and written back to the disk. The large Teach/M files were customized by these means.

Disk Fix can sometimes be used to unerase accidentally erased files. When a CP/M file is deleted with the ERA command, the first byte of the FCB is changed to the E5 hex character. No other change is made to the FCB or to the file itself. If the E5 character is immediately changed back to a binary zero, the file will be restored. The edit command can be used for this purpose.

It should be noted that there are several possible complications when an accidentally-deleted file is undeleted. If another file is saved after a file is deleted, the new file may write over the data areas of the deleted file. Now, the E5 byte of the FCB can be restored. However, the data is lost. Another problem is that there may be several erased FCB entries with the same name. Furthermore, large files require more than one FCB to list all of the blocks. Thus, there might be two erased versions of a file and each version might have several FCBs. Putting these pieces back together becomes quite a puzzle.

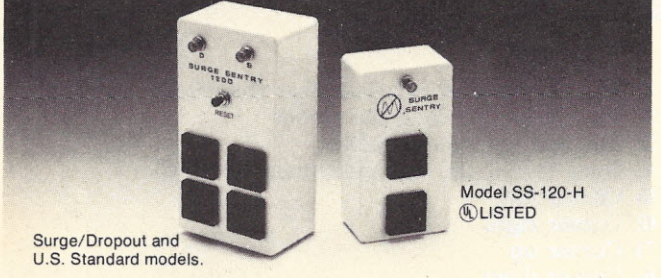
A third use for Disk Fix is the reconstruction of damaged disks. In the simplest case, suppose that there is a bad sector in the directory block. However, an important file is listed in another, undamaged sector. The 0 command of Disk Fix is used to open a new file on another disk. Then the M command moves the desired sectors to the new disk.

A similar technique would be used when a bad sector occurs in the data area of a file. In this case, a new file would be opened on another disk. Then the file up to the bad sector would be moved to the new file. The bad sector is skipped over, and the remaining sectors are moved to the new file.

Disk Fix is a powerful program, but it requires a thorough knowledge of the CP/M file structure. It cannot be used by a novice. □

Contributing editor Alan R. Miller is a Professor at New Mexico Institute of Mining and Technology, where he has taught materials engineering, thermodynamics and programming methods since 1967. He received his Ph.D from the University of California in Berkeley. He has authored five books dealing with computer languages.

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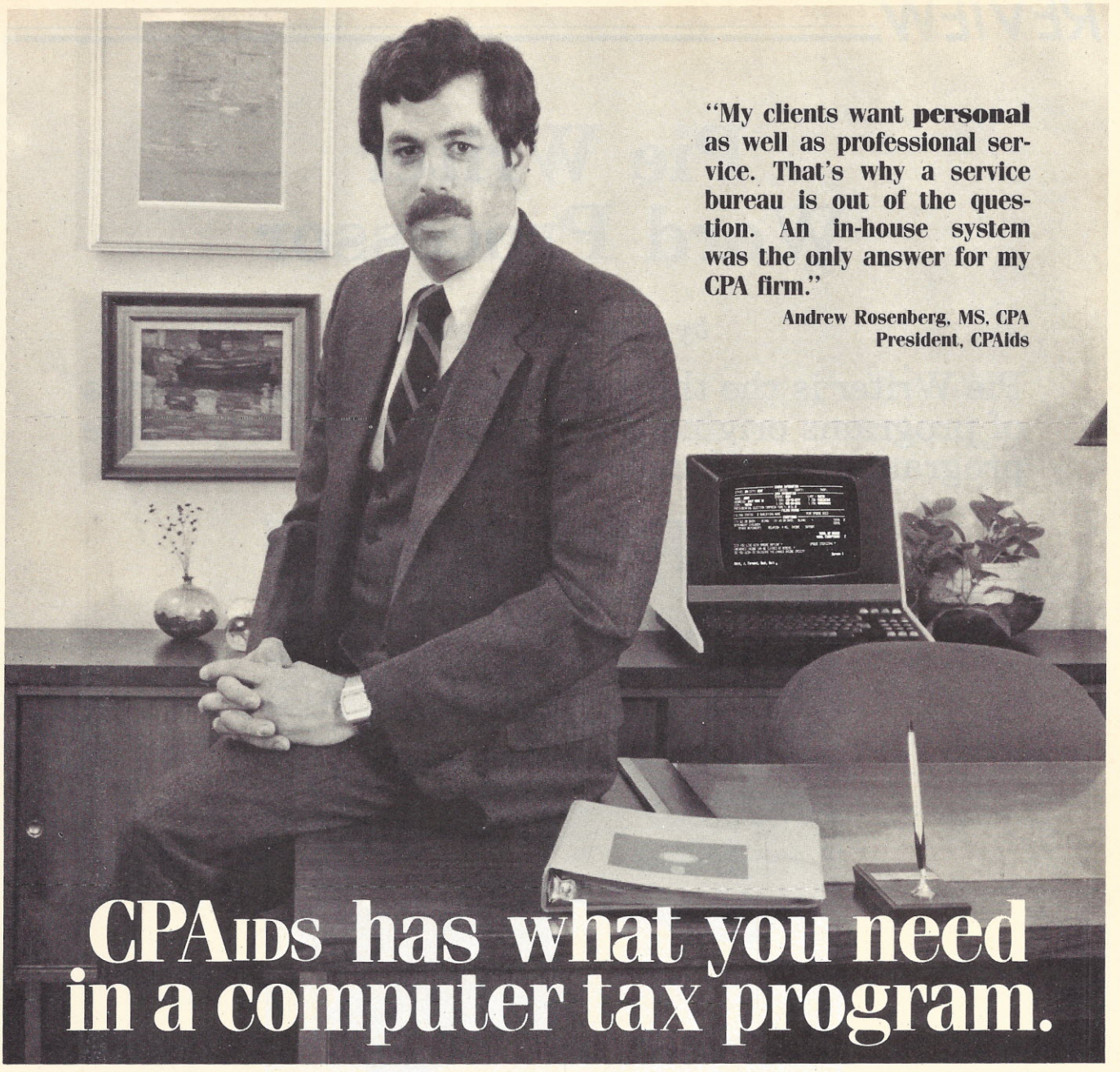
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CIRCLE NO. 21 ON INQUIRY CARD

Pie Writer Word Processor

by Robert Moskowitz

Pie Writer is the third incarnation of a useful series of programs originally developed as an early Apple programming aid called Apple Pie.



Make no mistake: this enhanced program release from Hayden Software (Rochelle Park, NJ) is a useful program. Even more, it is the workhorse of many Apple software collections. Unlike most true word processors, which are designed to be more character-oriented and self-contained, Pie Writer is actually five programs—not one. You get Pie, for text editing, Format, for text formatting and printing, Pie Configure and Format Configure, to set up the programs for your hardware and preferences, and Pie Aux, which contains a whole series of extra commands and functions that have been grafted onto the original set of features over the years.

Although Pie Writer works as a word processor, you can also use it for other applications, including: programming in Basic, file development (particularly for data you send or receive via modem), writing EXEC files—and more. It runs under Apple DOS 3.3.

Your first step with the program is to configure a working copy of the program disk to your system. You put the original disk away and use the working copy as your daily program disk. The program is available in both 40- and 80-column versions. If you opt for 80 columns, your disk is set up to prompt for a display configuration—different for each 80-column board. The Videx Videoterm, Sup'R'Term, Smarterm and DoubleVision boards are supported. Just select the one you have installed, and Pie Writer configures itself automatically. If you're operating with a 40-column display, or if you've completed the 80-column configuration, the first screen after booting is always the main menu. From here, you must manually select the Pie or Format configuration option whenever needed.

The 40-column version of Pie Writer was the only one used for this review, so there may be a few unnoticed discrepancies between its operation and that of the 80-column version. The major differences, however, seems only to do with the display configuration above and the length of strings for search or replacement operations.

The configuration options for the

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CIRCLE NO. 99 ON INQUIRY CARD

Editor allow you to preset your printer interface defaults, choose upper/lower or upper case only display, use the shift key modification, pre-set tab stops on the screen, choose wraparound or non-wrapping mode as the default conditions, set disk slot and drive parameters, modify the normal size of the text buffer, start and stop the Doubletime printer spooler, and change various other machine values and codes.

Formatting program configuration options allow you to set printer initialization and various control characters, and choose the default formatting parameters for the appearance of your printed pages—including line spacing, margins, characters-per-inch, paragraph indentations, justified or ragged right text, spacing between paragraphs and even a "need" value to be sure a certain number of lines remain at the bottom of a page before a new paragraph is allowed to begin printing.

Both configure programs allow you to record the parameters you want on the program disk, so on your next boot, the program is pre-set to your preferences. Pie Writer is extremely flexible, so most of these values are very easy to adjust time and time again as needed. You can re-run either of the configuration programs to record new changes at any time, or make immediate changes in most of these values via command keystrokes or imbedded formatting commands.

Configuring a program disk re-writes some of its loading programs and deletes some of its initializing files. This makes it important to save your original master and work exclusively with one or more back-ups. You can make as many back-ups as you need with your COPYA program from the DOS 3.3 System Master Diskette. One nice feature of Pie Writer is its total openness. The documentation gives a very complete list of significant program pointers, addresses, and two command tables, so you can re-structure the program's operation—right down to its keystrokes—to fit your special needs.

Pie Writer offers you a 38 (or 78) column by 21 line display. The text is displayed inside a dotted line window on the screen, with the 24th line of the display reserved for system status messages. This line displays the line and column position of the cursor, text entry mode, error messages and command prompts. When the program is executing a lengthy command, for example, the window may blank out and the status line displays the word BUSY.

The text in the window can also shift horizontally part way to display an additional 26 (or 50) columns. This feature allows you to take an on-screen look at the actual format you are preparing with the Pie Editor. However, you don't have to see this, if you don't want to. Pie Writer works perfectly well without shifting the display, even wrapping around the words you enter from the keyboard at whichever column you set as the "bell" column. No matter what your text looks like on-screen, Pie Format will follow your defaults and any imbedded commands to re-structure the text on its way to the printer. Thus you

could type
a screen that looks
like
this,

and Pie Writer is capable of assembling the words to form smooth, filled lines on the page—with full wraparound of words at the right-hand margin. You can disable this "fill" mode if you wish, though, and have Format print out the screen lines exactly as you type them in.

Pie Writer has a 21.5K text buffer, enough for about 14 typewritten double-spaced pages. Using its advanced file-switching capabilities, you can create longer documents by linking an unlimited number of these files together so they will print sequentially. Or you can simply do the sequencing manually.

Editing capabilities

During the writing/editing process, the program gives you full word processing capabilities, including:

- Cursor movements: up and down by line, by screen, and to the beginning or end of the file; left and right by single or multiple spaces, by word, by tab stop, and to the beginning or end of the current line.
- Scrolling: forward and reverse in the file by a full screen or by any number of lines; shifting the screen left and right by 26 (or 50) columns to display on screen the maximum width of the final formatted output.
- Insertions: any number of characters, or any number of blank lines, starting anywhere in the text. You can also insert about half a line of pre-keyed text at the cursor, with the existing text opening up to make room for it.
- Deletions: the cursor will "eat" text a character at a time to the beginning of the current line when moved with the left arrow key; or the cursor can stay put and eat text a

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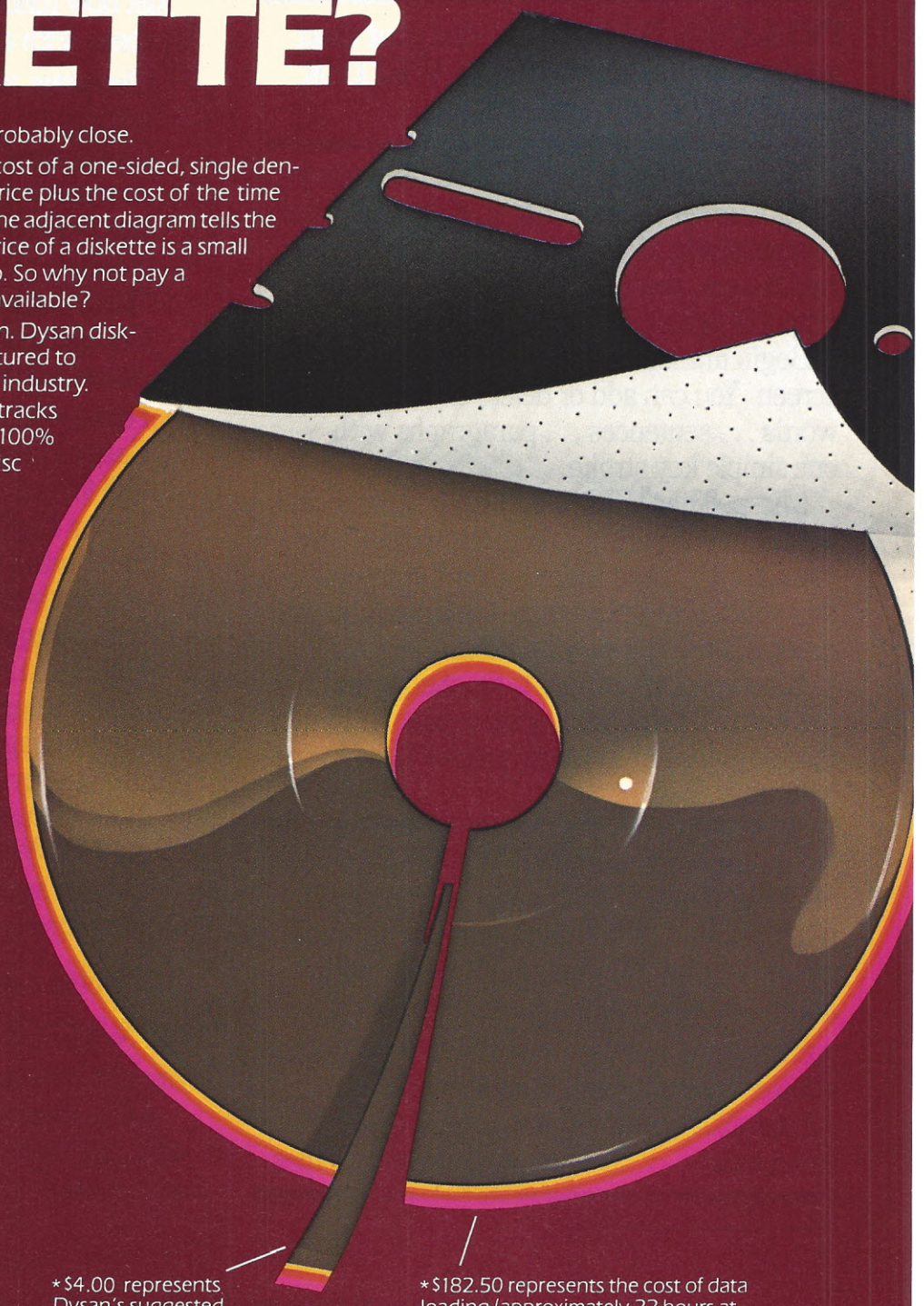
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CIRCLE NO. 40 ON INQUIRY CARD

character, a word, or a line at a time; any number of full lines can be deleted with a 7-9 keystroke command.

- Copying and moving text: up to 21 lines of text can be pulled into a buffer, with or without being deleted from its place in the text, and can be popped out again in another spot; any number of lines can be moved from the text to the current cursor position.
- Search and replacement: in either direction from the current cursor position, any string of characters up to about half-a-line in length can be searched, or replaced with another string; the search can be repeated any number of times, or every occurrence of the string can be found and/or replaced; the search can contain any number of wildcard characters that will match the same number of characters no matter what they are.

Formatting capabilities

Pie Format runs on your default configuration parameters and looks at any "." commands you imbed in your text to control every aspect of output formatting and utilize nearly every capability of your printer.

Format previews the text to the display screen if you wish, or sends 1-99 copies of it without a preview to the printer or to a disk file. A preview is always safer in case you mistyped or left out a significant formatting command. Format gives you the full range of word processing capabilities, including constant titles at the head, foot, or virtually anywhere on every page, page number, variable margins and line spacing, incremental character spacing for proportional print on capable printers, indents, centering, capitalizing, underlining and boldface, tabbing and columnar printing, access to special characters, use of form or sheet fed paper, and printer pauses with or without user-defined screen prompts. You could, for example, have the program prompt for input and include that input in subsequent printing.

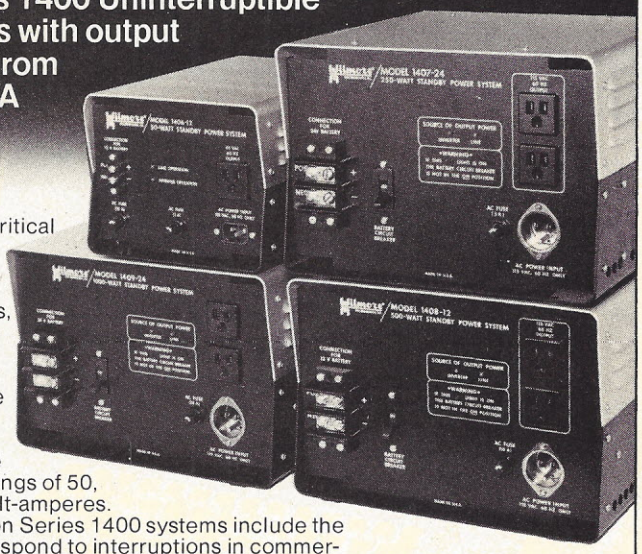
In addition, its advanced capabilities allow you to pre-program files to execute various commands and access other data files, either sequentially or as sub-files. I have not done it, but the program would allow for a previously prepared text file of names and addresses, for example, to be merged with another file containing a generic letter in such a way that a copy of the letter would be printed to every name in the first file.

Pie Writer can do even more. For

Continued on page 188

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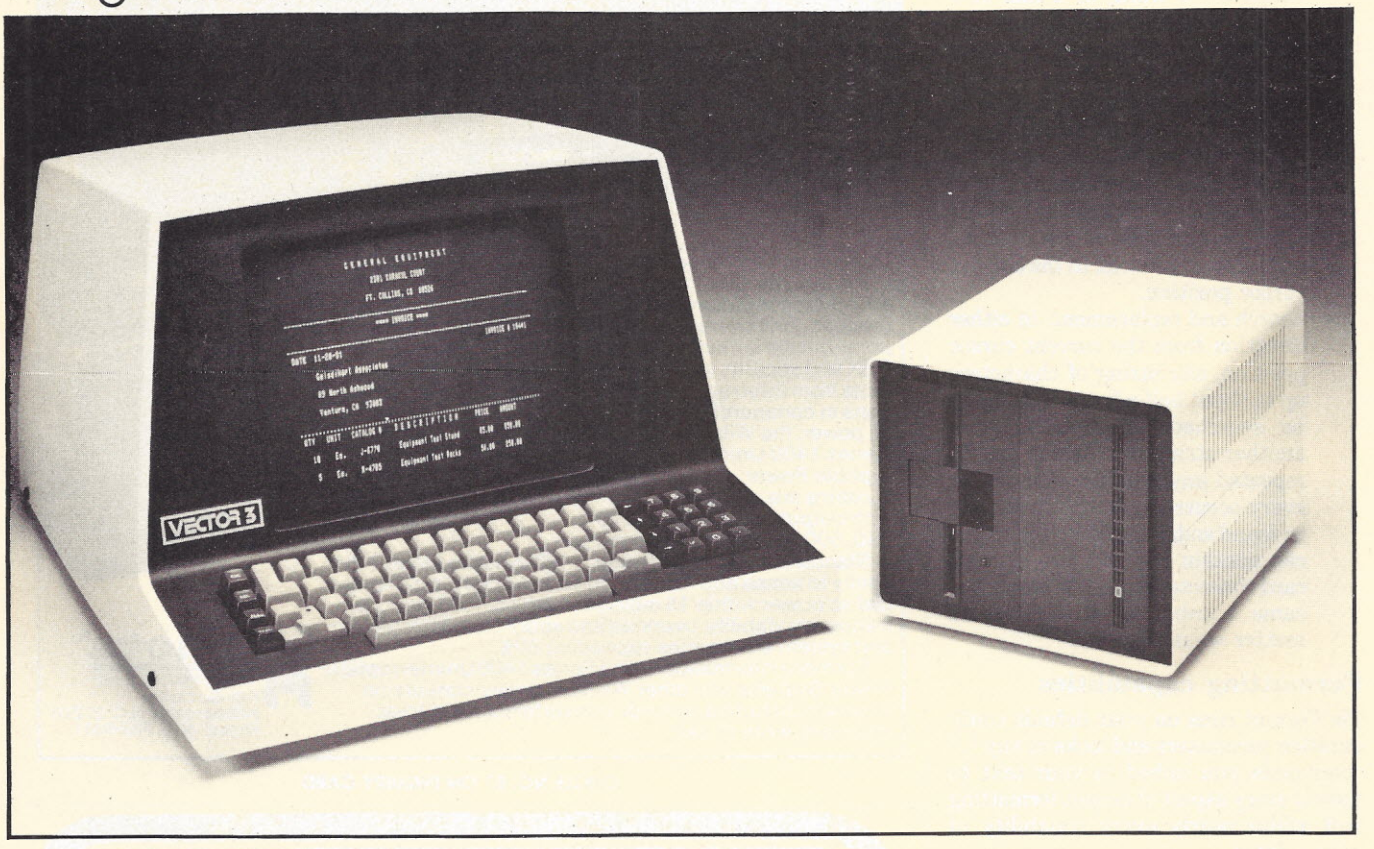
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CIRCLE NO. 42 ON INQUIRY CARD

Assignment: Benchmark



Vector Graphic 3005

by Hillel Segal

This month's benchmark system, the Vector Graphic 3005, was one of the first small business computers to feature the rapid, high-capacity Winchester-type hard surface disk drive as a standard feature.

The 3005 is the second Vector Graphic system covered in our benchmark series. System B (*IA* Apr 81) is a floppy disk system that was Vector's first complete computer product.

Vector Graphic (Thousand Oaks, CA) started as a manufacturer of S-100 compatible memory boards, then made a successful transition to the marketing of complete systems. The company has changed its approach to hardware configuration since System B was introduced several years ago. It used a dumb terminal connected to a unit containing the processor and disk drives. In the 3005 and other recent models, the processor and memory are located in the terminal cabinet, with the disk drives kept in a separate unit. A user can start out with a lower-priced system and upgrade the disk drives later.

The 3005 terminal includes a standard typewriter keyboard, 10-key numeric pad, and 12-in. screen displaying 24 lines of 80 characters. The screen has reverse video capability, but no graphics features.

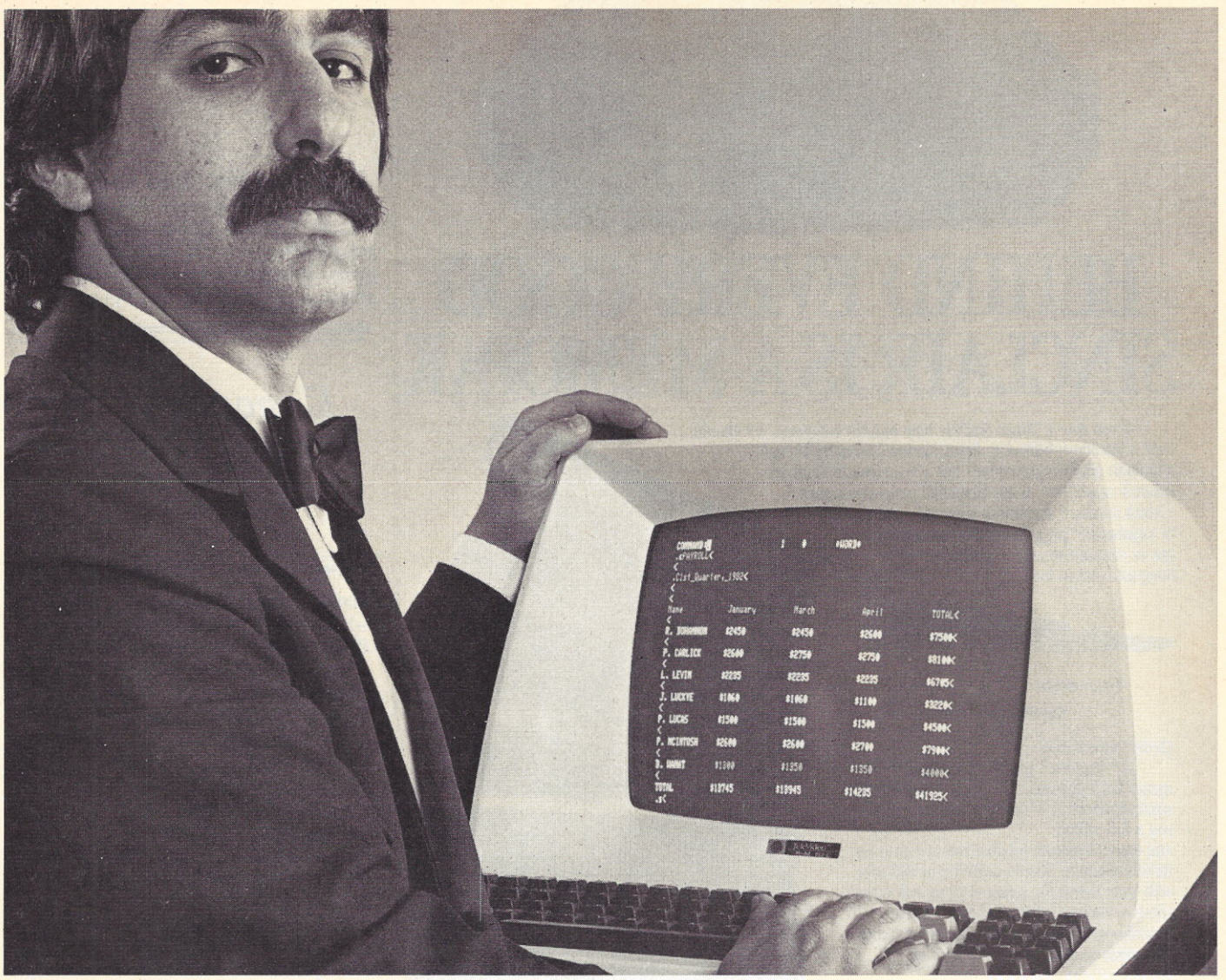
As tested, the 3005 cost $11,150, including a Qume Sprint 3 letter-quality printer. Without the printer, it sells for $7,950. Included in the system are the Z-80A processor, 64,000 characters of memory, the 5 million character hard disk, and a 630,000 character mini-floppy disk. The system has three printer ports and one RS-232 communications channel.

Dual role is emphasized

Vector supplies two letter-quality printers for the 3005, obviously emphasizing the system's dual role as word processor and data processor. Aside from the Qume, an NEC Spinwriter is also offered. It has the same 55 cps speed as the Qume, but uses a thimble-type printwheel rather than a daisywheel.

Other printers can be interfaced to the 3005. Users mentioned the Epson MX-80, Paper Tiger and Anadex. While not sold as a part of the 3005 system, many dealers can provide a package including the lower-cost printer.

Standard software includes the CP/M operating system, Microsoft Basic-80 language and several utilities. An excellent screen-oriented program editor is



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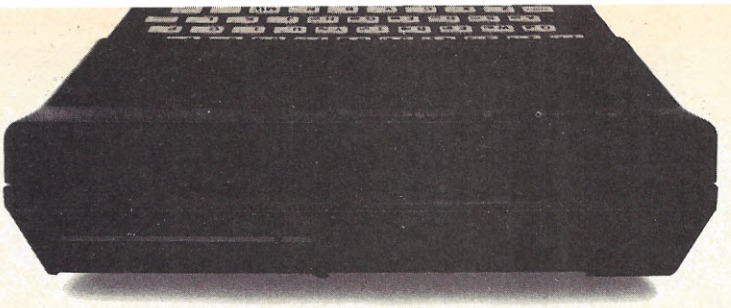
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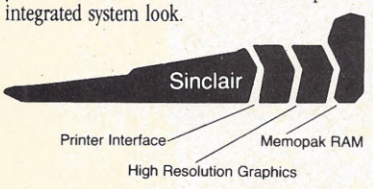
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also provided. With CP/M, users can run a variety of languages and programs. Pascal, Fortran, Cobol and other languages are accessible. No less than three program editors are provided: the Basic editor, a CP/M editor, and Vector's own Scope, a screen-oriented program editor, which, among other features, has its own Help command to assist new users.

ExecuPlan is Vector's answer to VisiCalc

Vector Graphic supplies several types of application packages. Its word processing system, called Memorite III, includes a spelling dictionary, automatic letter writing, mailing lists and other advanced features. However, the operator interface is rather hard to learn, since it relies on control keys not prompted on the screen. A Help command is provided, but a set of stick-on key labels would help out greatly in this area.

The ExecuPlan program is Vector Graphic's answer to VisiCalc, supplying the spreadsheet functions for management planning. A statistical package and a data management system are also available. For general accounting, the Peachtree programs are often supplied.

The 3005 incorporates both floppy and hard disks, and both were tested. As might be expected, the hard disk speeds up operation considerably. Using it, the 3005 finished our accounts receivable program in 2 minutes, 26.9 seconds. When the 5.25-in. floppy disk was used, the same program ran in 7 minutes, 45.6 seconds.

As usual, the tests were performed by the Business Research Division of the University of Colorado under contract to the Association of Computer Users. Reported here is the accounts receivable program, which sets up 50 customer account files on the disk, then updates them in a random sequence before displaying a report on the screen.

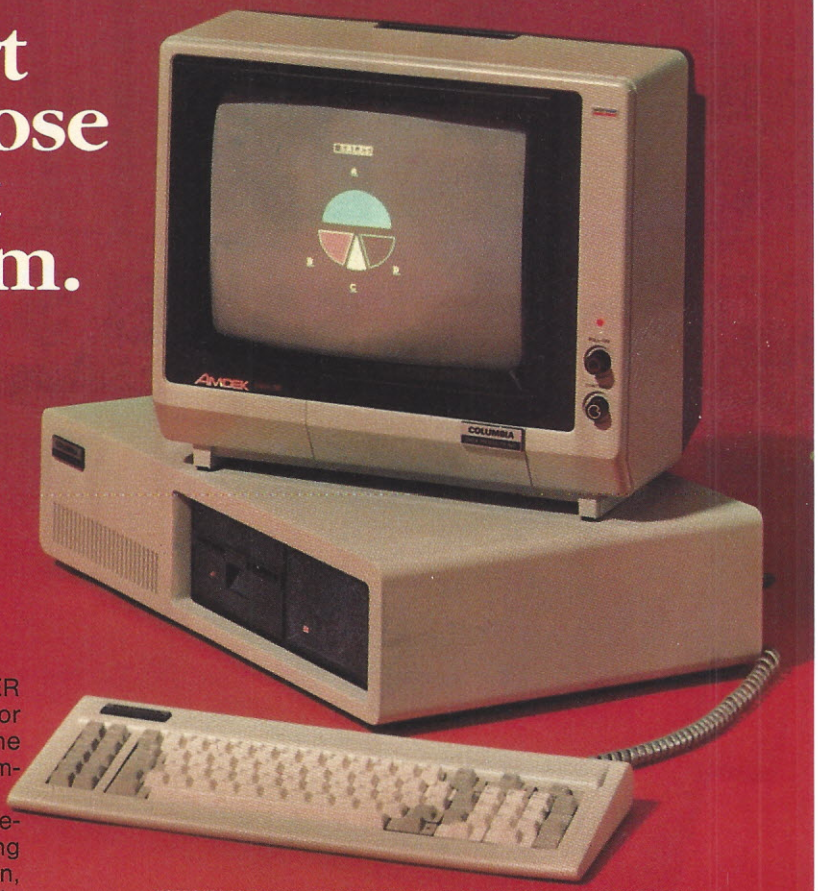
For most operations, the hard disk is used exclusively. It offers notable improvement for users accustomed to the slower access time and head-seeking noises of a floppy disk.

Users were satisfied

Users contacted during our survey were

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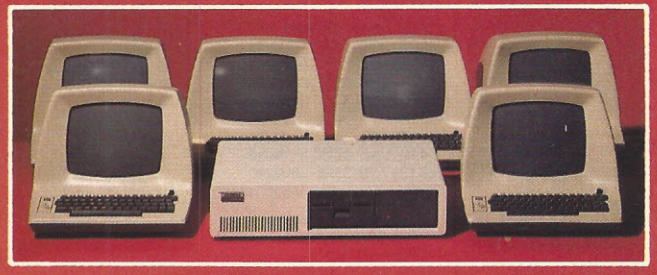
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IBM-PC Compatible Expansions Slots Beyond Professional Configuration[1]	8 Slots	0	?
Resident Floppy Disk Storage	Dual 320K (std)	Dual 160K (Opt) Dual 320K (Opt)	?
Resident Cache Buffer Hard Disk Storage	5M/10M	—	?
OPTIONAL OPERATING SYSTEMS (Supported by Company)[2]			
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CP/M 86	Yes	Yes	?
MP/M 86	Yes	—	?
OASIS-16	Yes	—	?
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Tape Cartridge System	Yes	—	?

[1]For comparison purposes, typical professional configurations consist of 16-Bit 8088 Processor, 128K RAM with Parity, Dual 320K 5-inch Floppies, DMA and Interrupt Controller, Dual RS-232 Serial Ports, Centronics Parallel Port and Dumb Computer Terminal or Equivalent.

[2]Columbia Data Products also supports CP/M 80® with an optionally available Z-80 CP/M Expansion Board.

*As advertised in BYTE Magazine, August 1982.



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generally very pleased with the 3005. Many were doing some in-house programming, as well as using canned packages. Microsoft Basic-80 was being used by all those programming; one user was also programming in Fortran. Memorite and ExecuPlan received mostly favorable reviews, as did the Scope editor.

Documentation is a frequent complaint by users.

The drawback most often cited was in the area of documentation. This is the most frequent source of complaints we've noted throughout the series of benchmarks, and as usual, the problem expressed by users was lack of introductory material for the first-time user.

Customers said hardware reliability and service were good—but about half noted they had start-up hardware problems. The system comes with a standard 90-day warranty, and service is provided by authorized dealers.

In addition to the actual benchmark testing, the ACU had an opportunity to study the Vector Graphic 3005 at length in our offices. We feel that it is a capable single-user system at a very reasonable price. □

Research Associate: Vic Schoenberg

Hillel Segal is president of the Association of Computer Users, a nonprofit association with members all over the U.S., Canada and several other foreign countries. A complete package of information is available from ACU, Box 9003, Boulder, CO 80301.

Benchmark comparison

	C-3 Accounts Receivable Time (min.)	Current Price
Vector Graphic 3005	2:26.9*	$11,150
Smoke Signal Chieftain	1:40.7	$ 8,149
Commodore CBM-8032	3:36.0	$ 4,085
SD Systems SD-200	6:16.4	$12,300
Billings BC-12 DF2M	5:09.2	$12,395
Dynabyte 5300	4:38.0	$ 7,735
NEC Astra	5:10.8	$ 9,890
Altos ACS8000-15	10:41.5	$ 9,875
Wang 2200SVP	2:23.0	$14,600
Pertec PCC 2000	6:04.3	$12,470
North Star Horizon	1:57.7	$ 6,911
Cromemco System Two	2:48.0	$ 9,275
Texas Instruments 771	3:38.1	$12,100
Vector Graphic System B	5:56.5	$ 8,995
DECstation 78	4:21.5	$10,495
Radio Shack TRS-80 Model II	3:38.6	$ 7,609
Apple II+	6:17.4	$ 4,330
Digital Microsystems DSC-2	3:28.8	$ 9,015
Ohio Scientific C3-A	15:49.3	$10,940
Alpha Micro AM-1011	3:25.3	$15,605
Data General CS/10 Model C1	2:40.3*	$13,400

to be covered in future issues

Xerox 820
IBM Personal Computer
IBM 5120

*Time obtained using hard disk

Peripheral Potpourri

by Roger H. Edelson



Useful new peripheral products include the USI International Amber Monitor, the Practical Peripherals Microbuffer, the Gosub Friction Feed Kit and the Axlon Ramcram.

Pi-3 monitor

The Pi-3 12-in. amber monitor from USI International (Brisbane, CA) is housed in an attractive beige and black metal case. It offers an ergonomic alternative to white/black and green/black, display monitors. While it provides a high resolution screen (1,000 lines horizontal at the screen center) and 20 MHz bandwidth, the most noteworthy feature is the amber, monochromatic display.

Apparently, USI has spent considerable time and effort researching the studies done into the relation between operator performance and comfort and VDT/monitor screen color. Citing more than five reports in a background handout, USI makes a case for the amber display (a yellow phosphor with an amber filter) as the most eye-soothing, highest performance, choice for a VDT display. After spending a few hours in front of the amber screen, I became convinced that it is a much more comfortable display color than the customary white on black, and is somewhat more pleasing than most green displays.

As with most video monitors, the terminal gets high marks for ease of connection and operation. The Pi-3 provides two video inputs on the rear panel—a SO-239 RF style connector or an RCA phonojack. The input impedance provided at either connector (they are wired in parallel) is a standard 75 ohms, and the monitor expects a standard composite video signal (video plus vertical and horizontal synch pulses) of 1.0 volt peak-to-peak. A switch has been provided just below the SO-239 connector to select either normal or reverse polarity for the video source, which aids in interfacing with many systems.

On the front panel, the Pi-3 provides an ON-OFF power switch (it's nice to have this in the front instead of hidden on the rear panel) and an LED, which indicates if the power is on. The power ON/OFF switch is hidden behind a pull-down door, which also covers the contrast, brightness and vertical and horizontal hold controls. This arrangement provides a neat, uncluttered appearance to the front panel of the Pi-3, but it would have been slightly more functional if the power switch had been placed outside of the door.

Other than plugging in the three-wire power cord and the video input, there really isn't much to do to use the monitor. Once up and running, the monitor provides an eye-pleasing amber display. When used as a VDT alphanumeric-style monitor, the 80-by-24 characters are very crisp and readable. The monitor retails for $249.

Microbuffer for Epson

Practical Peripherals (Westlake Village, CA) has come up with a handy modification for users of the popular Epson line of printers. The Microbuffer provides hardware spooling for printer activities, thereby printing and processing operations to occur simultaneously. As the Microbuffer stores data in its on-board memory, the computer can dump data to the printer until this buffer is full, and then go on to other duties.

The buffers for Epson users come in two models—an 8K-byte, RS-232 serial interface unit (the MBS-8K), and the 16K parallel interface model (the MBP-16K). Both mount easily within the printers, using the auxiliary slot provided by Epson for the serial interface board. Both Microbuffers are compatible with Graftax-80 bit-image graphics; the MBP is a parallel interface, and the MBS model converts the RS-232C incoming data into parallel bits. The serial interface model supports both hardware and software handshaking at baud rates from 300 to 19,200.

Buffer storage for either Microbuffer is provided by 64K bit dynamic RAM integrated circuits. It seems a strange selection—static RAMs should be easier to interface, as no additional control circuits are required—but it works, and the prices are reasonable. Practical Peripherals indicates the design decision was made on the basis of selling price and board space. The memory requires only one IC (for the 8K model) and a single additional controller chip. Both models are priced at $159. The parallel unit uses two 64K chips. The serial device, which I reviewed, uses just one device.

Advertising literature indicates that both models may be user-expanded to 32K, but the MBS-8K that I have has the memory chip soldered in place, and there are no space IC locations. A call to the company confirmed my suspicion—it is an advertising goof, and it has since been corrected. In my application, 8K buffering is a big help, but most of my articles run between 16K and 24K, so a 32K-sized buffer would be perfect.

The serial interface is fully compatible with RS-232C standards, and user configuration of the interface is easily accomplished by Berg jumpers. One may set baud rate, word length, number of stop bits, and the parity criteria with these simple plastic clips. Further, the selection of hardware/software handshaking, and the sense of the BUSY signal are also configured as easily. The software handshaking protocol is the relatively standard X-ON/X-OFF technique, and requires that pin 2 (Transmit Data—TXD) be connected. For hardware handshaking, pins 4, 11 and 20 are utilized, and the manual states that the normal configuration had these three signals tied together. On my unit, however, the RTS line is intentionally severed. That is probably the correct configuration, as in most

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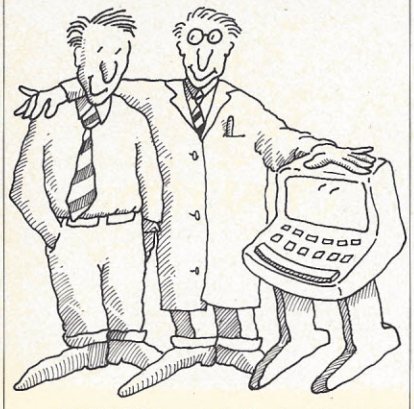
Microfazer™ stack. Microfazer can be stacked with popular modems or other peripherals. Some models can plug directly onto the back of your printer. Install it in less than 60 seconds, and choose the amount of buffer memory you need— 8K, 16K, 32K, or 64K. One model even comes with up to 512K! You may use several Microfazers in series to create just what's right for you. Take data in from a serial computer and out to a parallel printer. Or in from a parallel computer and out to a serial printer. Microfazer is just as flexible as you need it to be.

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circumstances this signal is not used. Provision has also been made to allow the other two hardware handshaking lines—DTR and the Reverse Channel (RTS)—to be easily cut.

Using the model MBS-8K is simple; the hardest task is opening the printer. Once the serial interface has been configured, the buffer is then plugged into the auxiliary interface connector. At this point, the printer case is buttoned up and the buffer may be connected to the computer serial port. If everything was done correctly, the Epson should perform its self-test function normally, and upon power-up, the printer head should return to the left-hand margin. The MBS-8K provides 8,192 bytes of storage, but sets the BUSY line ON when the buffer reaches 8064 bytes to prevent buffer overrun. When the buffer has emptied to 7936 characters, the BUSY line is reset allowing data transmission from the computer to the printer to begin again.

While this hysterisis is adequate to prevent character loss and buffer overflow, I would have preferred a significantly greater separation between the BUSY and BUSY* states. With a separation of approximately 8,000 bytes, there would be almost no interference associated with printing while using the computer for other tasks. With this empty/full separation and a 9600 baud rate, there would only be an 8 second pause every 1.5 minutes—a delay that I could easily adjust to when using WordStar. This modification can probably be accomplished by a software change in the 2716 EPROM, but no code is provided. A representative of the manufacturer indicated that the BUSY/BUSY* separation was selected to allow the computer to be released from servicing the printer as soon as possible. The company agrees that when the Microbuffer is used for spooling operations involving word processing functions, a significantly greater separation would be far more effective. The change can be made through a software modification, but there are no current plans to provide this modification. There simply has not been sufficient demand.

The Microbuffer is well-built and has been very reliable in operation. I have experienced no errors in my use and testing—not even a soft bit error, which would be attributable to the dynamic RAM. If the Microbuffer detects any errors in the RS-232C channel (ie. parity, framing, or overrun) they are indicated by printing the "@" symbol. For Apple owners, there is a model that fits into any slot but Slot-0. Other printer combinations have not been forgotten either; for these uses, the company offers both serial and parallel stand-alone versions. All of these models are user-upgradable to 32K. The 32K model starts at $299 and the serial models allow different input/output baud rates and handshaking protocols. All Microbuffer models permit significant time savings by freeing the computer from continually servicing a slow printer.

Gosub Friction Feed for Epson

Another useful Epson add-on product also caught my eye. As my Epson MX-80 was obtained before the availability of the Friction/Tractor Feed (F/T) design, I have been looking for a modification, or attachment, that allows single sheet feeds. There is one such device that allows this function but eliminates the adjustable width tractor feature—a provision I find unacceptable. It was with great anticipation, therefore, that I awaited delivery of Gosub's MX80/70 Friction Feed Kit. For only $49.95, it promises a single sheet paper feed that would still allow unaffected operation of the standard pin-feed drive.

The kit consists of two end springs, two polyurethane rollers and a front roller assembly. Installation requires less than 15 minutes and a modicum of manual dexterity. It is necessary to remove the top half of the printer cover to allow access to the upper round bar, which forms a part of the tractor feed assembly. Once this bar has been removed, the items securing the square drive axle are also removed to allow the left end of this bar to be lifted slightly. After freeing the end of this axle, the pin-feed wheel is removed along with the plastic roller. The two polyurethane rollers are slipped onto the axle, the pin-feed assembly repositioned, then the disassembly operation is reversed. The front-roller assembly bracket is attached to the printer scale bar with the double sticky tape provided, and the springs are connected between the scale bar and each round end of the axle. It probably takes longer to read this description of the operation than it does to perform it.

Unfortunately, once the kit had been installed, my printer did not feed single sheets of paper or handle roll paper. Extra pressure on the scale bar provided enough friction, but I don't want to have to hand-hold the printer every time I use a single sheet of paper. The people at Gosub were helpful—another set of rollers was sent along with slightly stronger springs, but the mechanism still stubbornly refuses to handle non-tractor paper. I really wish the

Continued on page 186

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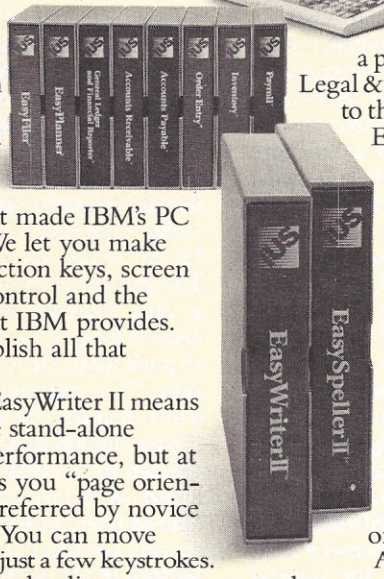
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CIRCLE NO. 44 ON INQUIRY CARD

Double Density Shortcuts

by David D. Busch

A simple conversion that accommodates double density disks for your system can shave expenditures and provide increased convenience and performance.

Once double density disk storage became widely available for the TRS-80, either through the new Model III, or by retrofitting a double density controller to the Model I, it was inevitable that reviewers would pounce on the new hardware. This article is not intended to delineate in technical terms what the advancement is, or how it works. Instead, we will highlight the meaning of double density to the average TRS-80 user—who may or may not be technically-oriented.

Double density's popularity was recently fueled by the recognition of its validity (even with the Model I) by Tandy/Radio Shack (Ft. Worth, TX). The company introduced a double density controller last summer, and updated TRSDOS to match. Converters are also available from PERCOM and others. Double density disk operation offers four outstanding advantages.

Firstly, because of the increased storage space available, even on a system disk, single disk drive owners can function almost as if they had a second drive and diskettes available. The equivalent of a $400-500 disk drive can be had for the $159 price of the double density controller module.

Another benefit is that those with more than one drive gain greatly increased disk storage, again without the need to purchase additional drives. Swapping disks can be reduced considerably. For the four-drive small businessperson who has been unable to contain all of inventory, or accounts receivable in a quartet of drives, on-line access to an entire database becomes increasingly practical.

Thirdly, disk read/write functions are speeded-up considerably. The drive's head can read or write twice as many data bits per revolution, with a resulting faster disk I/O time—even for those with drives limited to 40 MS track-to-track stepping.

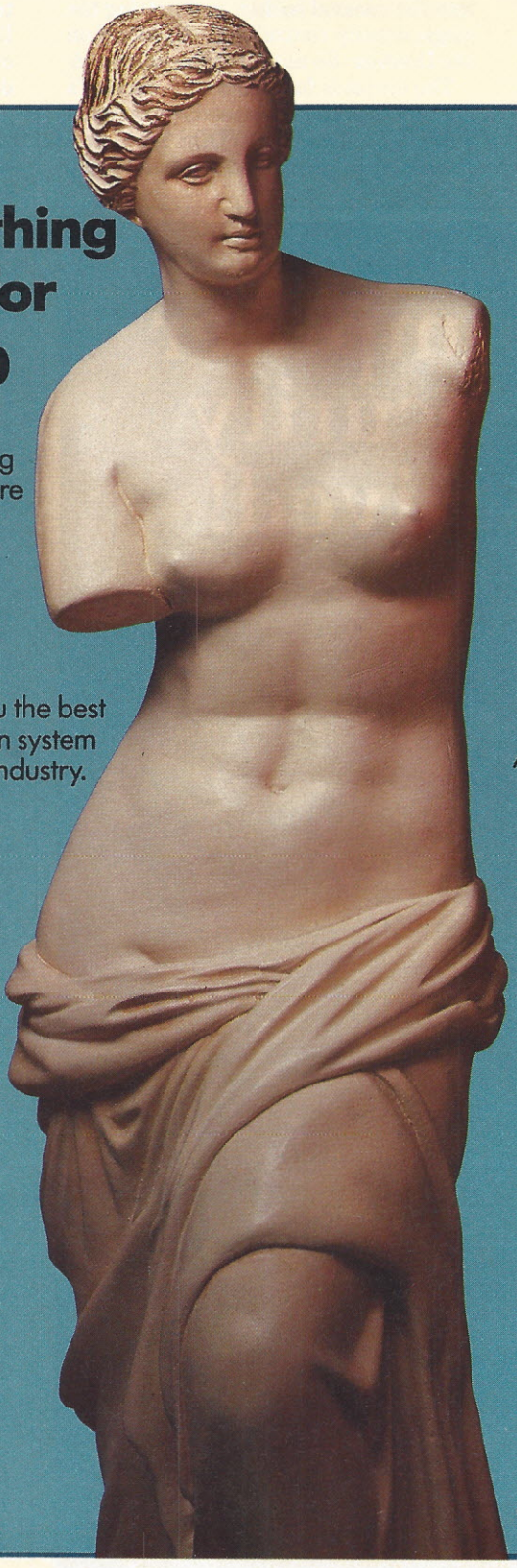
Finally, significant media savings can be realized by those who use a great many disks. Compare the 80-90K bytes that can be stored on a single disk under the original Radio Shack drive specifications with the 360 to 400K bytes that can be put on both sides of a 40 or 44 track "flippy" disk.

These advantages can be gained even by those who have no interest in performing heavy hardware modifications to their computer. I sympathize with the plight of the new breed of business-oriented, turnkey computer operators. Unlike the homebrew wizards of the past, there are many of us who are more comfortable with VARPTR than with variable resistors, and, as software users primarily, have no desire to soup-up the electronic workings of our TRS-80's. When we have difficulty deciding whether a problem is due to a faulty diskette, oxidized PC card contacts or a cranky microwave oven, it's often best to avoid introducing another variable. The term double density, then, originally conjured up images of violating the innards of the expansion interface with some mysterious, possibly error-prone hardware modifications. I avoided adding a double density disk controller to my TRS-80 for several months, partly because of a distrust of my own abilities, and partly because of a reluctance to give up the enormous advantages of NEWDOS 80 just to gain some extra disk space.

Fortunately, double density has gained respectability since then. With Tandy supporting and installing it, and NEWDOS 80 2.0, LDOS, DOS 3.4, and other operating systems available, nothing is lost, and much can be gained.

First, let's take a brief—but unavoidable—look of what the Doubler and similar converters are and how they perform their magic. Under single density operation, the disk controller interleaves clock pulses with data bits when writing to the media. Double density devices include a special disk controller and external data separation circuitry that allow deleting some of these clock pulses, and writing data to disk in these "blank" spaces. When disk drives that are rated for double density operation are used with this controller, disk read/write functions are every bit as reliable as under single density. The process is *not* analogous to slowing a tape recorder down to 3.75-in. per second from 7.5-in. per second in order to pack more music on a given length of tape. That particular procedure causes a loss in quality in the finished recording. Under double density, each data bit is written to the disk at exactly the same speed as before, but is not as widely spaced from its neighbor. Instead of 10 sectors per track, the computer puts 18 sectors in the same space—an increase of 80%. Because of this tighter packing, the drive is able to read and write the information much faster than before.

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Installing a double density converter is not difficult. The trickiest part of the entire procedure is carefully prying the old disk controller chip from its socket. The IC is inserted in a matching socket on the Doubler, and is used when the operator wants to fall back to conventional single density read/write functions. No traces have to be cut, no soldering done. It's just a matter of removing the old chip, plugging the Doubler board into the vacated socket, and putting the single density controller in the socket on the Doubler. So much for the hardware.

The device is furnished with Percom's DBLDOS, which is somewhere between TRSDOS 2.3 and NEWDOS 2.1 in usefulness. As I mentioned, if I had to rely only on DBLDOS, instead of NEWDOS 80, I probably wouldn't have converted to double density at all. However, NEWDOS 80 2.0, LDOS, DOSPLUS 3.4 and other operating systems all support double density.

Because double-density operation offers different advantages for those with different disk drive configurations —and problems unique to each—the discussion has been broken down along those lines.

Double density for single-drive owners

One of the biggest headaches single drive owners have is the need to swap disks every time they decide to do a new task. It's necessary to KILL most utilities from diskettes used in a single drive in order to leave room for programs being written, debugged, or RUN. When I had only one drive, some disks were loaded full of machine language programs on which Basic/CMD and many of NEWDOS+'s SYS programs (such as SYS11, SYS12, and SYS13) had been KILLed. On others, COPY was missing, and the old Basic version of SUPERZAP/CMD resided on only a few disks. I did more disk swapping than programming.

Double density will allow the one-drive owner to include all the utilities he or she might want on every disk, and still leave plenty of room for programs. Even a 35-track disk drive loaded with a complete NEWDOS 80 converted to double density will have 55 grans free. With a 40-track drive, and by killing a few seldom-used utilities, a user will have about the same space available as those using two 35-track disk drives under single density.

Incidentally, my Drive 0 is an ancient Radio Shack-supplied Shugart drive dating from sometime in 1978, and it works reliably under double density.

Double density for two-drive owners

When more than one drive is available, the uses for double density start to get really interesting. I pack my system disk, which always remains in Drive 0, with a full complement of utility programs, including IRV, DDT, and a machine language packer module. In addition, frequently-used disk data files, such as my travel expense report, auto cost/gas milage, freelance article file and others never leave the drive. Very handy.

My second drive is capable of 44 track operation. Under double density, that provides 151 grans free for data



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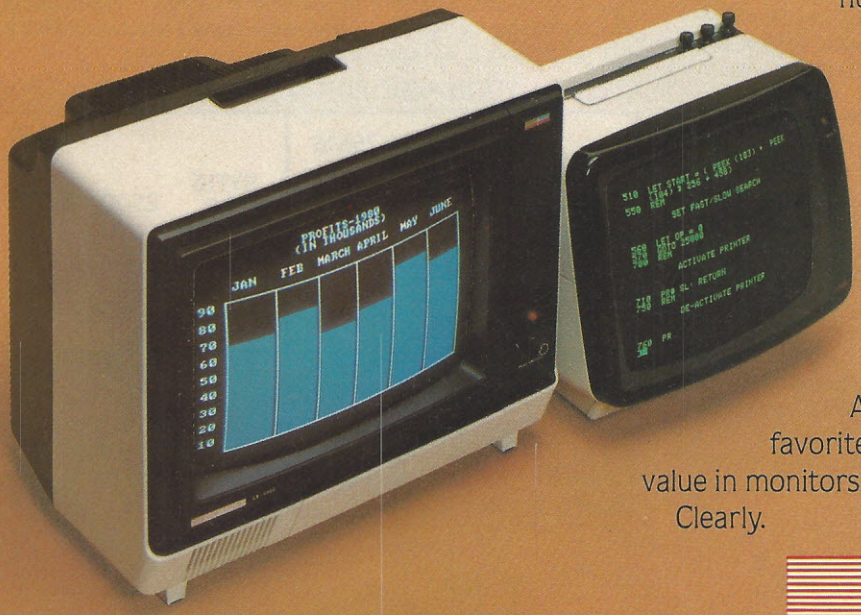
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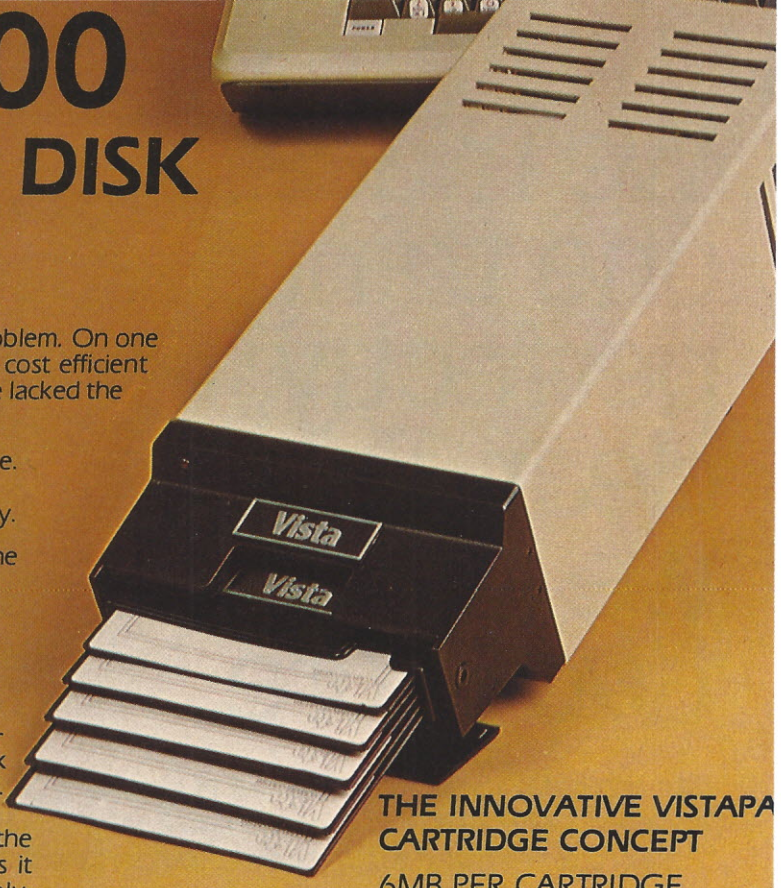
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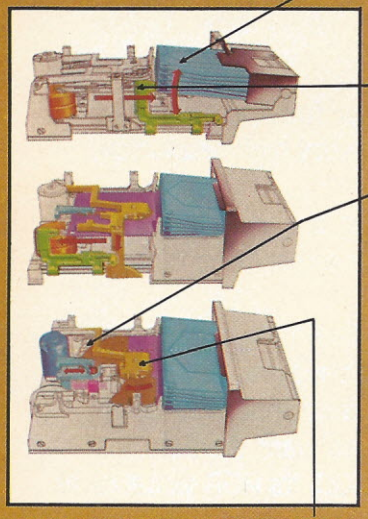


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The Vista V1200 also incorporates features such as; automatic recalibration of the drive if left unused for 2½ minutes, automatic diskette storage should the drive door be opened, and power conservation logic to insure no more than one motor is operating simultaneously to keep temperature down, and reliability high.

The VistaPak cartridges hold 6MB of formatted data each. The removable cartridge allows you to keep duplicates of your valuable data as well as to keep separate paks for your accounting, wordprocessing, spreadsheet and other applications. No other storage device offers more in flexibility and capability.

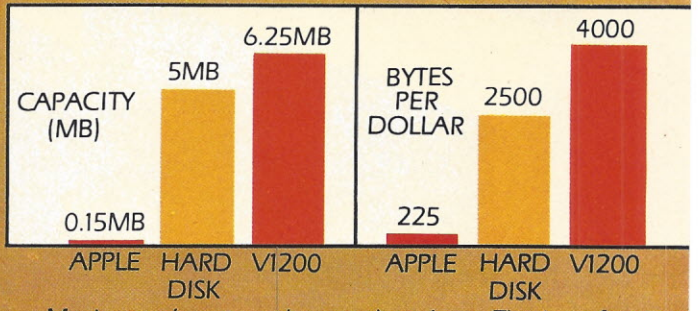
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diskettes. I can write articles with Scripsit for a week, and not have to worry about filling up a diskette. Business people and others with reasonably-sized databases may find that two double density drives are sufficient. For the low cost of the Doubler, plus the price of a suitable double density DOS, the two-drive owner has gained 1.6 more drives.

Converting single density files to double density can be done several ways with two disk drives. CONVERT utilities are privided by Radio Shack and others. Those with operating systems that allow locking in one drive at single density, and another at double density, have an additional option. Simply place a minimal system double density disk in Drive 0. This will contain more than enough room to hold all of the files contained in a single density disk. Then copy all the files from the single density disk in Drive 1 to Drive 0. With NEWDOS 80 2.0, this can be accomplished with a simple COPY :1 TO :0,NFMT,CBF,USER command. USER specifies that only program and data files, not system files, are copied. By placing a double density data disk in Drive 1, the converted files can then be copied over for permanent storage. PURGE the system disk (PURGE :0,USER in NEWDOS 80) and start over until all your disks have been converted.

Another relatively new feature is automatic density recognition. When ADR has been activated, the user can forget about whether or not a single or double density disk has been loaded into a drive. The system will switch over to the correct mode to access the disk. Conversion is thereby made a lot simpler.

Double Density for three and four drive owners

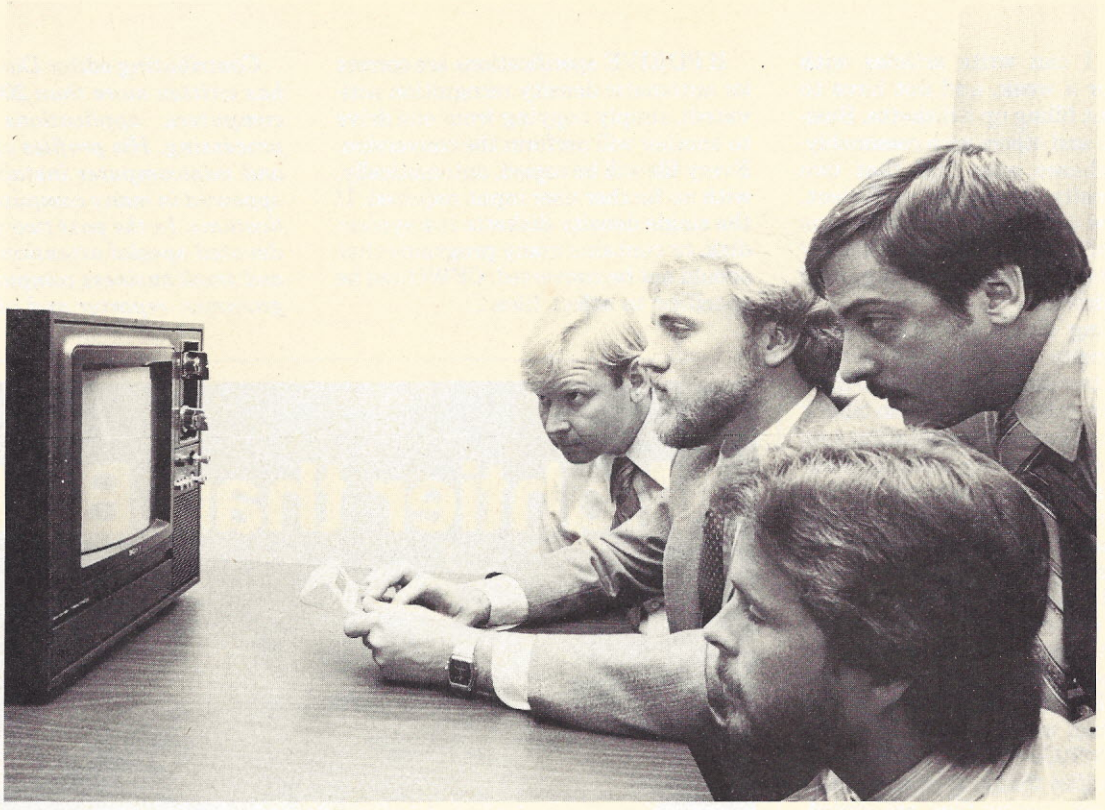
Those with three or four disk drives can finally have nearly unlimited databases online at one time. Three 44-track drives can hold nearly 600K bytes of information in data diskettes, and that doesn't count the additional space left on the system disk in Drive 0. Those with 77 or 80-track drives have proportionately more disk space available to them. Besides having the luxury of huge quantities of double density diskette space available, owners of more than two drives enjoy a definite edge in transferring files.

Just insert a double density NEWDOS 80 diskette in Drive 0, the single density disk in Drive 1, and a disk that has been formatted for double density in Drive 2 or Drive 3.

If PDRIVE specifications are correct (or automatic density recognition activated), simply copying from one drive to another will perform the conversion. Every file will be copied, automatically, with no further user input required. If the single density diskette is a system disk, or contains many programs that should not be converted, CFWO can be specified to select files. □

Contributing editor David D. Busch has written more than 200 articles on computers, applications and word processing. His profiles of mainframe and minicomputer installations have appeared in many computer trade publications. In the past two years, he has devoted special attention to personal and small business computers as a programmer, reporter and observer.





Videotex: Data Transmission for the Masses

by Antone Alber

The advent of videotex services may legitimize daytime "TV" viewing in the business environment. Huge banks of information will be available from interactive and broadcast databases at very affordable rates.

The computer industry has just celebrated its thirtieth birthday. The age began with vacuum tubes and machines needing the power of a locomotive to function properly. It has advanced to the point where thumb-sized integrated chips that require the power of a flashlight are commonplace. But the high-tech industries and society in general are on the threshold of an even greater period of change—a time when computers and databases will be available to virtually everyone within reach of a CRT and a telephone. The vehicle that will make this possible is called videotex.

Interactive videotex service

Interactive videotex is a two-way system allowing users to access a computer and database and display the information on a modified CRT (figure 1). Access to the information is gained using either a small handheld keypad similar in appearance to a TV channel selector or by a full alphanumeric keyboard.

The system end usually consists of a minicomputer such as a DEC 11/44 or a GEC 4082, secondary storage for the database, equipment for preparing and editing information and the software needed to operate and administer the system. On the user's side is a specially modified television and a keypad or keyboard for accessing the system.

The television has an integrated decoder that converts the signals being received into text and graphic images. In addition to integrated decoders, it is possible to attach a decoder to the radio frequency antenna jack of a standard television. However, the quality of the display is inferior to that achieved by incorporating the decoder at time of manufacture.

A television set used in this type of environment is referred to as a home information terminal and may also be used for normal television viewing. For business applications, a modified CRT may be used (which does not permit television reception). Business information terminals may be small enough to fit on a desk and only display black and white images.

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Other spelling checkers "borrow" their words from printed dictionaries —or copy them from old word lists. Or give a programmer who can't spell "programmer" a chance to write his first dictionary. And as though all this wasn't bad enough, a lot of these companies want to charge you $100, or $200 or even $300!

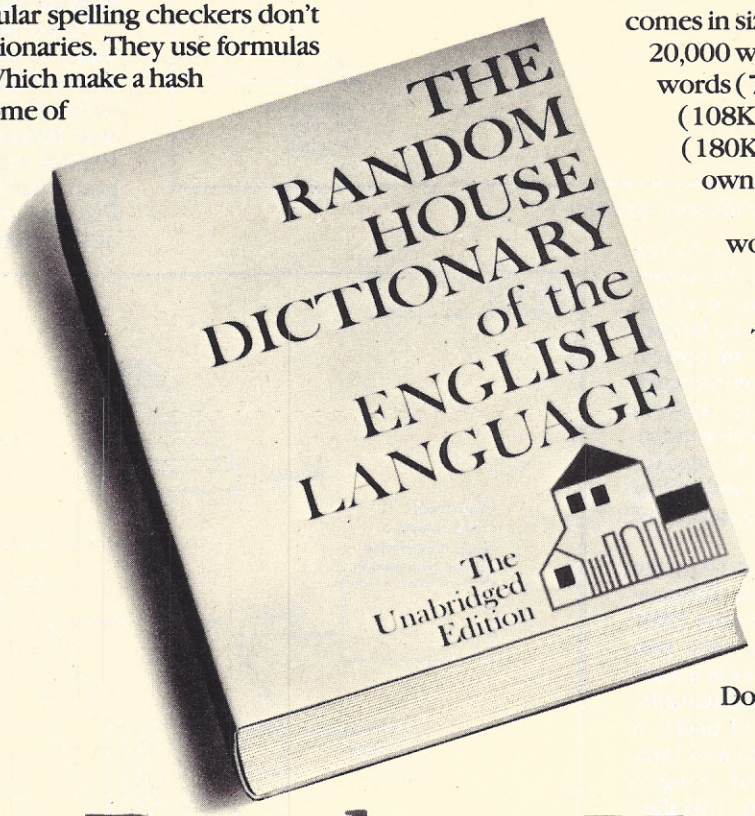
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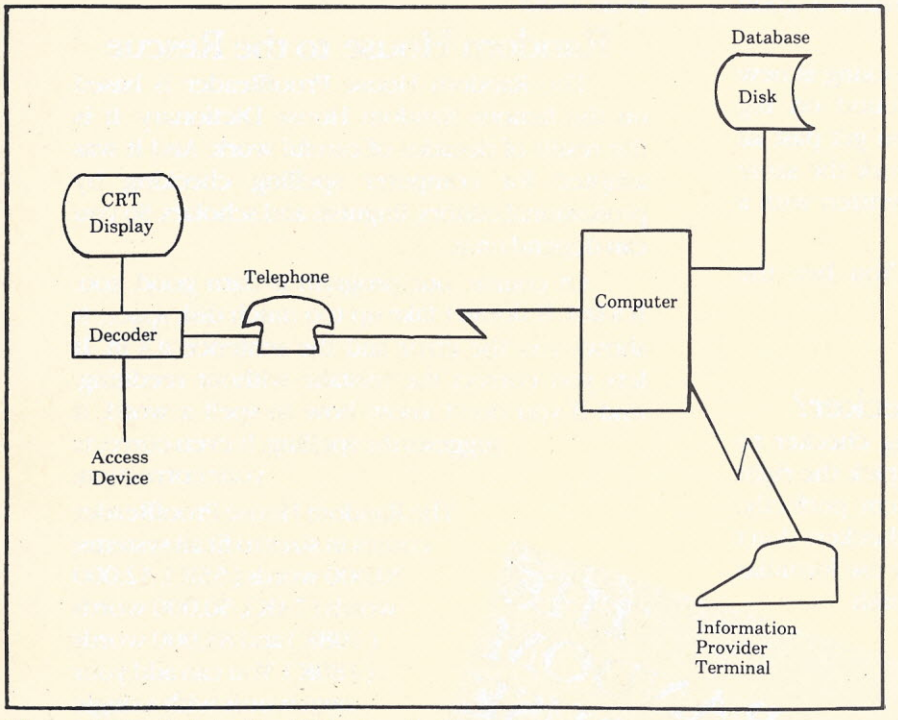


Figure 1. An Interactive Videotex System

Normally the user connects to the computer via the telephone. However, several trials are underway in which two-way cable is used, and the British have integrated a section of optical fiber into their transmission network for Prestel. The computer system needed to support an interactive videotex service is not extensive. Except for the specialized applications and utility software, a system consists mostly of off-the-shelf hardware.

The International Viewdata System (IVS) marketed by Aregon International Inc. (Stamford, CT) uses DEC equipment. A DEC 11/24 with two 67M-byte disks and 32 ports is a suitable configuration for a small installation. For a large number of users, a VAX 11/780 with 250 ports and bulk disk storage may be needed. Aregon has several systems presently installed in Europe and is actively marketing them in the United States.

Virtually any computer could be used to receive videotex. However, since the major activities consist of access and retrieval of information rather than numerical calculations and file manipulation, computers are selected generally for communications ability rather than for computational power.

One of the few pieces of equipment not traditionlly found in a DP environment is the information provider's terminal. The IP terminal is a specially-designed unit for the creation of pages. If used offline, the terminal may consist of a color CRT with keyboard, a microcomputer and several RS232-C ports. Interfacing with the terminal may be a variety of peripheral devices such as a graphics tablet, videotex decoder, printer, video camera and modem (figure 2). The software accompanying the system usually includes graphic and text editors, database management routines, and a communications program. The cost of a fully-configured terminal ranges from $20,000 to $30,000 and requires a trained operator with graphics skills. An on-line unit attached directly to the computer being used to provide the videotex service may be considerably less expensive, depending on the peripherals included.

There are several commercial services in operation and a number of major trials underway that are likely to result in public services within the near future. The most widely known is Prestel run by the PTT (Postal Telegraph and Telephone) in Great Britain. Prestel is composed of a large network of GEC 4080 and 4082 computers. It

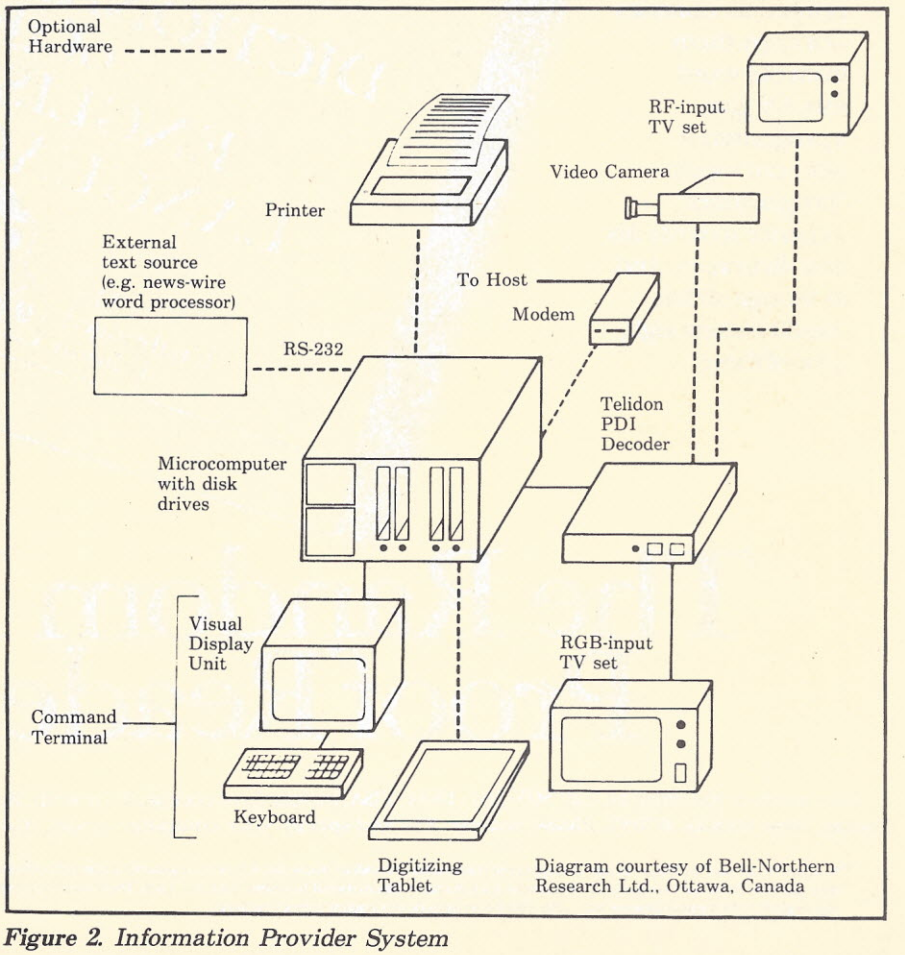


Figure 2. Information Provider System



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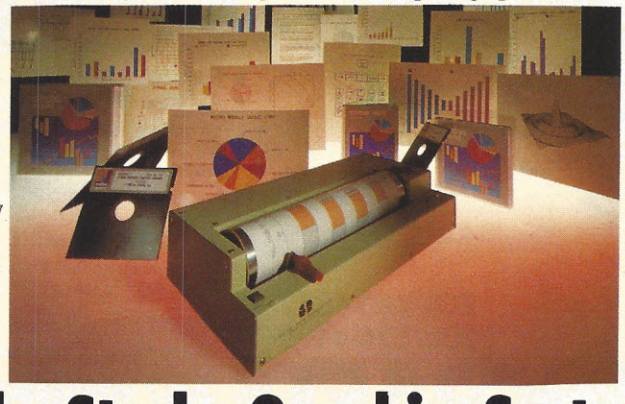
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There are presently 18,000 subscribers to Prestel and 500-600 new registrations are being added each month. Interestingly, four out of five registrations are for a business rather than a residential user. The designers of Prestel had projected that such information services would be used most heavily by private individuals. Instead, businesses are finding it an efficient and economic medium for storing and retrieving data. Consequently, Prestel has been seeking to strengthen its appeal to the business community while retaining a foothold in the residential market.

In the United States, CompuServe (Columbus, OH), with 27,000 subscribers, and The Source (McLean, VA), with 21,000 subscribers, each market a videotex service. Access to the extensive databases is possible by making a local phone call in over 360 cities to a nation-wide communications network. Although a significant percentage of the terminals in use are popular microprocessors, most standard data terminals and some communicating word processors may also be used.

Prestel was begun as a trial program in 1976 with the expectation that it would lead to greater utilization of the telephone system during evenings and weekends. However, as it matures, additional benefits have become apparent. Prestel provides a service for business users such as the travel industry, which heretofore has not been available. It provides current and easily-accessible information to the public and is a vehicle for exporting goods and services in a previously nonexistent area.

In addition to these commercial services, a number of trials are also underway throughout the world (figure 3). In most instances, these are being carried out under the sponsorship of the government and are the forerunner of a public service. The British, French, and Canadian governments are especially supportive—both financially as well as vocally—of the videotex efforts underway within their own borders.

The French PTT began a videotex trial in May, 1981, in the town of Velizy near Paris. Teletel will enable phone subscribers to obtain directory assistance from a computerized database, thus eliminating the need for printing and distributing phone directories. In addition to Electronic Directory Service, a full slate of applications will be incorporated within Teletel over time. PTT plans to ultimately give away 30 million information terminals to phone subscribers within ten years. If this

Country	Trial Name	Number of User Terminals
Canada	Grassroots	322
	Project Ida (completed)	30
	Vista	500
Finland	Telset	310
France	Teletel	3,000
Germany	Bildschirmtext	7,764
Japan	Captain	2,000
Netherlands	Viditel	4,700
United States	Channel 2,000 (completed)	200
	Viewtron (Coral Gables, completed)	200*
	Times Mirror Videotex Services	350

* A smaller set of terminals were rotated among 200 test homes.

Figure 3. A partial list of interactive videotext trials underway (or just completed)

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Figure 4. Main index

goal is reached, the populace of France is likely to be the first in the world to have a computer terminal in every home.

The Canadian Department of Communications has developed a videotex service with an enhanced graphics capability, named Telidon. One such effort is the Grassroots project in rural Manitoba for providing farmers with the key information required to conduct their farming activities effectively and more cost-efficiently. The introductory phase completed in Spring, 1981, consisted of placing 25 Telidon TV terminals in local agricultural agents offices, credit unions and other public locations where farmers gather to do business.

Phase two of the project involves the leasing of terminals to individual farmers and expansion of the database to include a variety of subjects from pesticides to water resource management...farm engineering to farm home economics...crop insurance data to economically-based feed mix combinations.

Broadcast videotex

Another form of videotex that does not allow two-way interaction between the user and computer is called broadcast videotex—or teletext. In a teletext service, the information is continuously rebroadcast—either in conjunction with the regular television signal or separately.

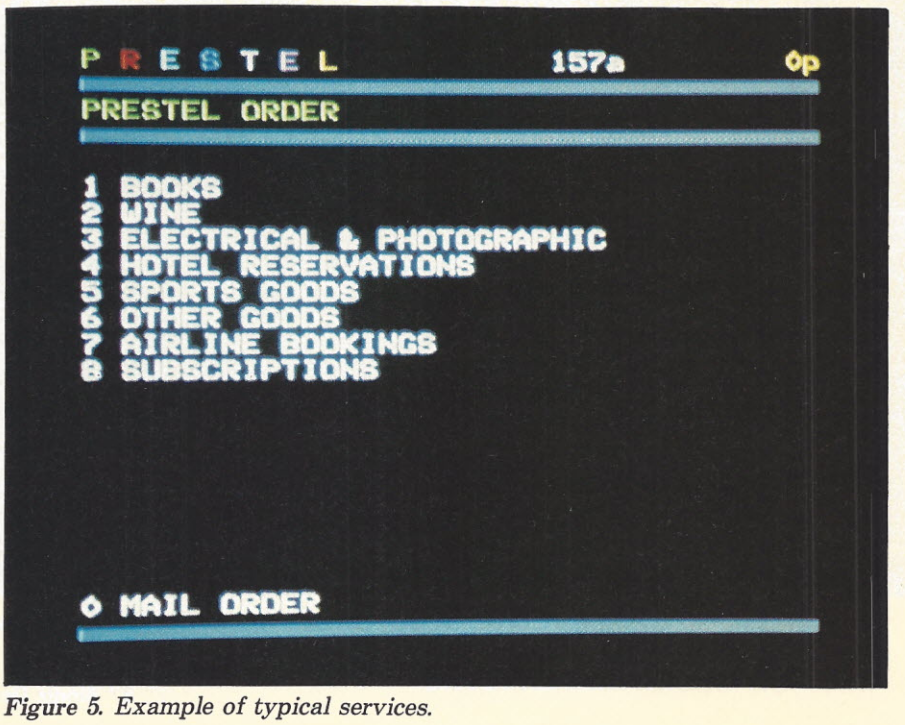


Figure 5. Example of typical services.

When the teletext signal is broadcast with the regular television signal, a portion of the vertical blanking interval (VBI) is used. In the United States, the TV signal is composed of 525 lines. Twenty-one of these lines, the VBI, are reserved for carrying reference and test signals. Two or more of these lines can carry digitally-encoded textual and graphical information for display when the teletext option is selected.

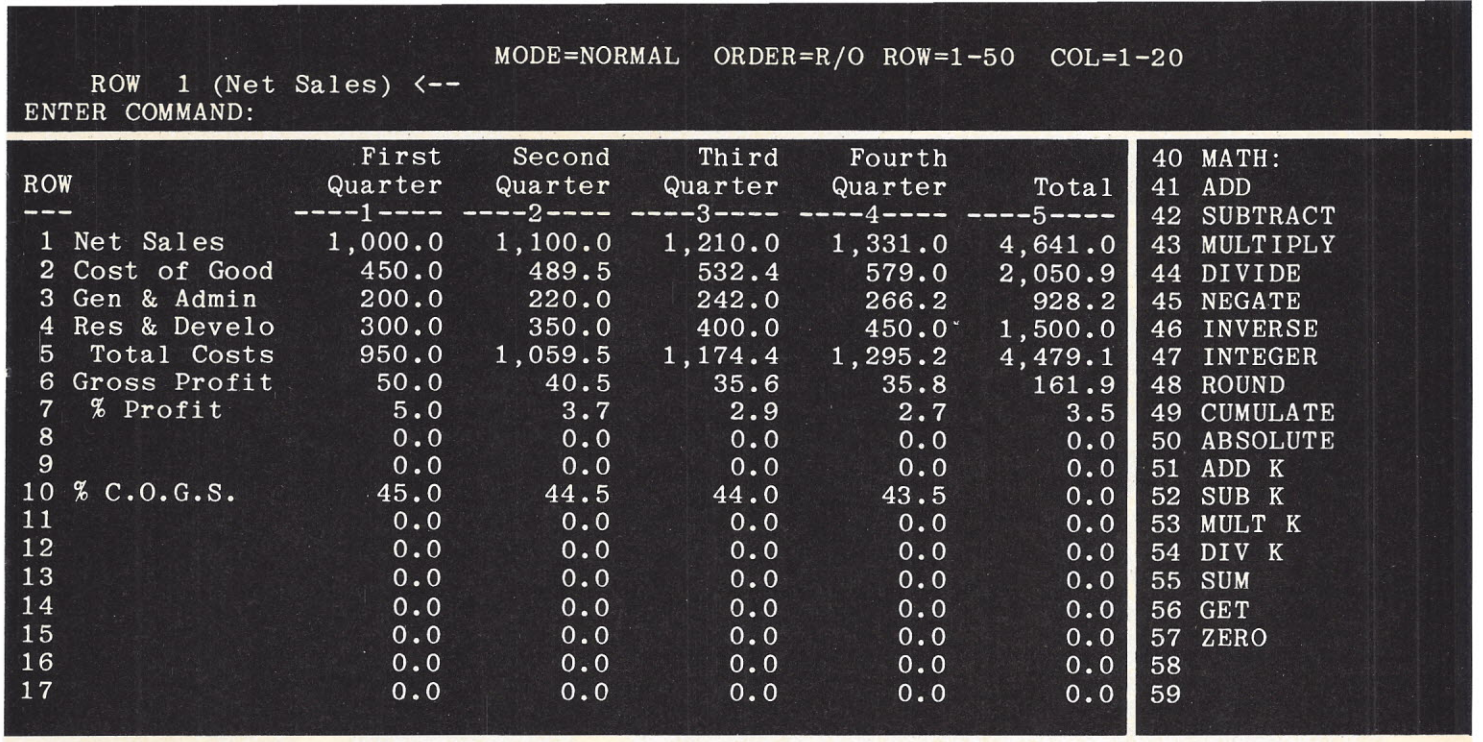
Because of the one-way nature of Teletext, it is necessary to continually rebroadcast all of the database. Consequently, the size of the database is largely dependent on how many lines of the TV signal are used. If desired, all of the signals used could be dedicated to teletext transmission.

One or more of the pages being broadcast is an index containing page numbers for locating information in the database. A user identifies pages from the index and "grabs" them as they are recycled by inputting the correct page number with a keypad. As each page is accessed, it is either displayed or stored temporarily—depending on whether another page is being displayed.

In order to provide an average response time of 12 seconds, a database broadcast over two lines of the VBI seldom exceeds 300 pages. If an entire channel were dedicated to teletext, a database of about 10,000 pages could be rebroadcast continuously and still provide an acceptable response time.

There are two public services operating in Great Britain. CEEFAX (for See-Facts) was developed by the BBC (British Broadcast Corporation) and ORACLE (Optional Reception of

Continued on page 192



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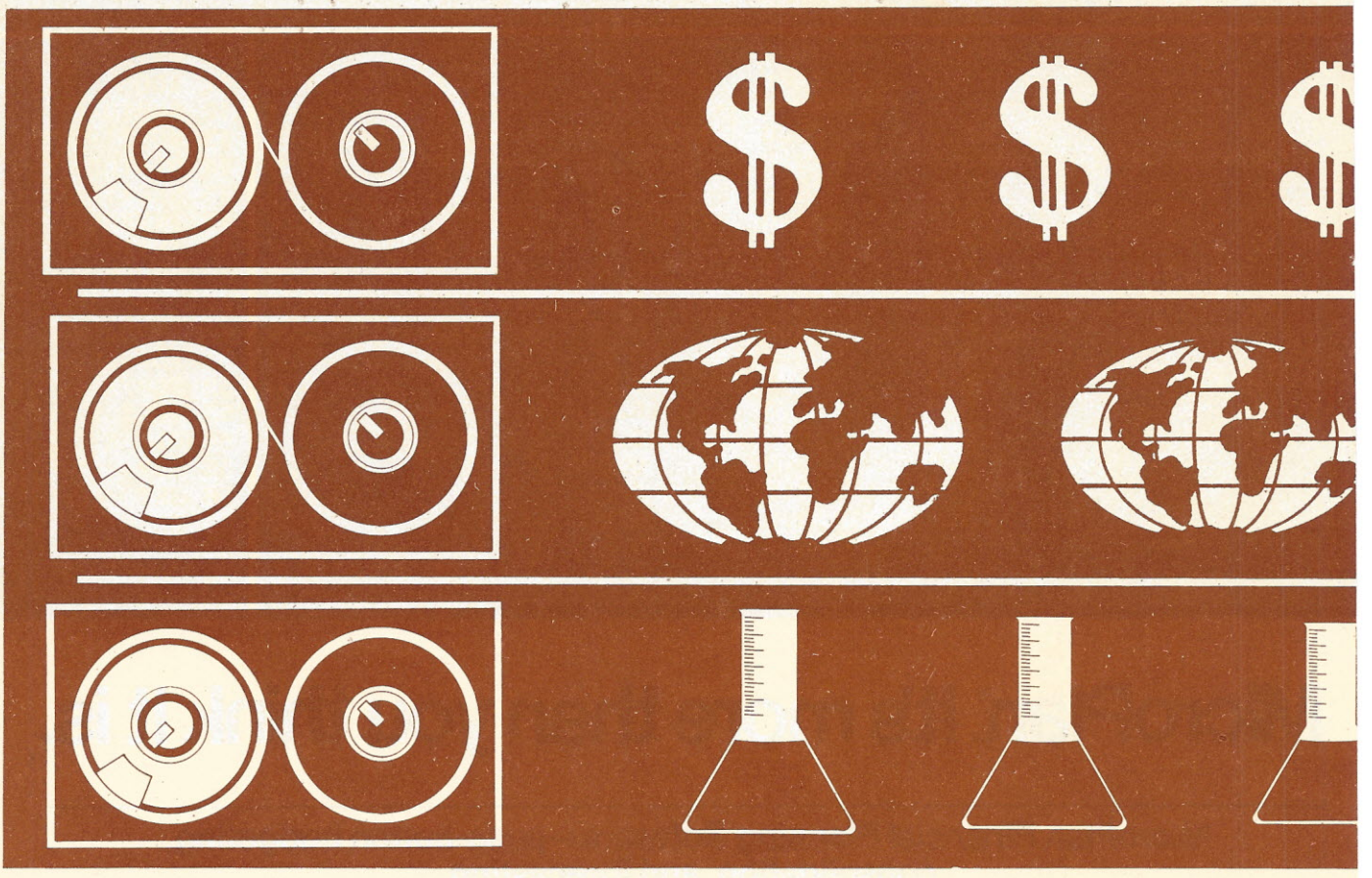
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Previewing the Information Era

A Look at Four Commercial Information Services

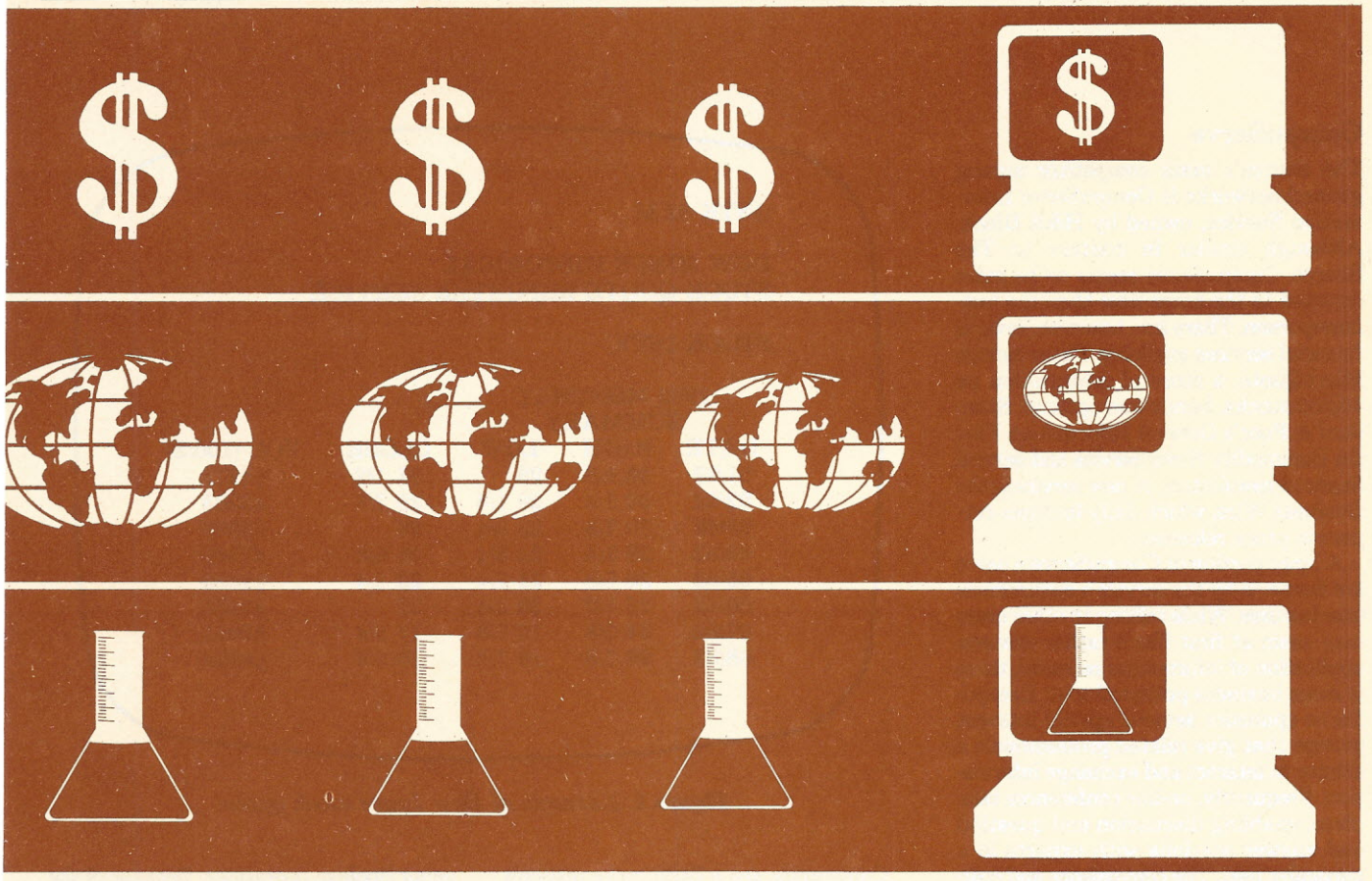
by Jim Cavuoto

By now, nearly everyone has heard about the changes society will supposedly undergo because of computer and communication technology. Terms like "office of the future," "electronic mail" and "the information society" hover like oracles over our heads. In fact, the information era is already upon us. The three million home computer owners in this country and the countless others with access to terminals at work already have an opportunity to sample this phenomenon. They are able to access a wide range of information from computerized databases. All it requires is a modem and enough curiosity to put it to use.

Although there are numerous computer-based databases in existence today (one report estimates over 1,500 holding 150 million records), only a few are general enough to be marketed to a mass audience. the four we will examine are The Source (McLean, VA), CompuServe (Columbus, OH), Lockheed's Dialog (Palo Alto, CA) and Dow Jones News Retrieval. (Princeton, NJ). Each differs in format, price and intended audience, so that comparisons, in many cases, are difficult to make. On the other hand, a discussion of the relative merits of each may help you decide which is most useful for you and your business.

Before logging on to one of these systems, a user should be somewhat familiar with some general concepts. Of foremost concern are the hardware and software requirements. As noted earlier, a modem and either a microcomputer or dumb terminal are all that's required. A microcomputer has a distinct advantage over a terminal. It can exercise much more control over incoming data than a terminal, which functions merely as a passive display device. Communication software typically allows a user to automatically save data in a "capture buffer," which can then be edited and saved to disk after the user is off line. Other possible functions include formatting the display, changing between upper and lower case, transforming incoming and outgoing characters and turning the printer on or off. A printer, while not required, is certainly an advantage if you plan to do anything with the information received on-line—unless you've got a really good memory.

You should also have some idea about communication protocol—the rules gov-



erning data transfer between computers. In order for two devices to communicate over the phone lines, there must be total agreement between them on several factors. These are baud rate, the speed with which data is sent out and received into a computer; duplex, which indicates whether or not both devices can talk simultaneously; character length, the number of bits making up each character; and parity, a means of error detection. Most communication software packages will set these parameters for you once you've determined what the other party is using.

Finally, it's a good idea to understand the commands that a network uses before logging on. While most of the systems have help available on-line, you'll find that your connect charge can really mount if you spend time learning what should have been learned off-line. Some of the networks use plain English or mnemonic commands, but even these can be confusing to a first-time user. Each network uses different commands. For searching operations, a common method is boolean algebra, which should give no trouble to anyone who's had a course in logic or Venn diagrams. A searcher uses words like AND, OR and NOT to selectively locate records.

A user logs on to a system by placing a local call to a common-carrier data network, such as Telenet or Tymnet. After typing in the required password, the user is then connected to the host computer without the need for a long-distance call. Typically, data transfers at 30 characters-per-second, which is slightly faster than most people can read on a CRT display.

Fortunately, either the host computer or the microcomputer user's communication software usually offers commands for freezing the display.

The Source

The Source, founded in 1979 and purchased by Reader's Digest in 1980, consists of 45 information databases. Its 17,000 subscribers are split roughly half and half between business professionals and hobbyists. One of the most useful features of The Source is UPI news service, which provides up-to-the-minute general, business and sports news. You can also search previous days' news, using keywords to select the stories you need.

Of interest to the business user is UNISTOX, which gives timely information on stocks, bonds, commodities, precious metals, futures and foreign money market exchanges. Also available for a higher fee is Management Contents, Ltd., which contains abstracts from 27 business journals; Commodity News Services, a news wire on commodity trading; and Media General, which offers historical data on 3100 common stocks.

Two unique features of The Source are the travel and employment databases. The former allows you to get airline schedules between any two cities. The latter contains listings of available job openings and personal resumes throughput the country. There are many other features, directed toward home users, ranging from catalog shopping to adventure games. For the most part, however, the programming features are not overly valuable. Considering the cost of connect time, the rather slow throughout and the lack of graphics, a microcomputer user would be better off buying equivalent software. New users will appreciate the menu format, which gently—though not particularly speedily—leads to the desired option. Alternatively, experienced users can enter an alphanumeric command to get to their destination faster.

Membership in The Source requires a $100 registration fee. The connect charge is $18/hr prime time and $5.75/hr evenings and holidays. There are extra charges for storage, 1200 baud service and certain financial services.

CompuServe

The Source's main competitor among general networks is CompuServe Information Service, owned by H&R Block. Although similar in content to The Source, CompuServe seems to be more directed to the home user than the businessperson. There are, however, several financial services available. These include MicroQuote, a store of information on 40,000 stocks, bonds and options; Standard & Poor's General Information File; the Commodity News Service and several financial newsletters. A new service is the Business Wire, which daily features corporate press releases.

A large portion of CompuServe's users are drawn in by the service's communication features. While talking to other users may seem at first like a rather esoteric application of information retrieval, there is some business potential to it. CompuServe sponsors several special interest groups that give related professionals a chance to interact and exchange information. Frequently, on-line conferences take place, enabling discussion and question and answer sessions with experts in a particular field. The convenience and cost-effectiveness of assembling on-line many users from across the country might make this a viable alternative to "in-person" business and trade conferences.

CompuServe is formatted similar to The Source, with easy maneuverability—once the commands are learned. It uses a page-based system: a heading and page number appear at the top of each video frame. This makes it easy for a user to "flip" to the page he wants. It may also drive people crazy waiting for new information to be displayed.

Connect charges for CompuServe are $22.50/hr prime time and $5/hr evenings and weekdays.

Dow Jones News/Retrieval

Probably the most valuable financially-related service is Dow Jones News Retrieval, operated by the same company that publishes the Wall Street Journal. A daily summary of the Journal is available on DJNR, as well as news stories from Barron's. Stories from as far back as 1979 can be retrieved using free text search.

The financial services available include current and historical quotes, Media General Financial Services, forecasts from Money Market Services and a weekly economic update. In addition, Disclosure II offers extensive information on publicly-held companies and Corporate Earnings Estimator delivers performance predictions for individual companies.

;1STK 82 M

DOW JONES HISTORICAL
STOCK QUOTE REPORTER SERVICE

STOCK 1STK

1982 MONTHLY SUMMARY

DATE	HIGH	LOW	CLOSE	VOL (100/S)
01/82	36 1/8	28	31 1/2	54275
02/82	33 1/4	29 1/4	29 7/8	45203
03/82	30 7/8	23 3/4	26	56869
04/82	28 1/4	24 3/4	25 5/8	43160
05/82	26 5/8	21 3/4	23 1/4	59885
06/82	23 1/2	20 1/4	21	31455
07/82	21 7/8	16 7/8	17 3/4	35901
08/82	20 7/8	16 1/4	19 7/8	33724

Figure 1. Example of Dow Jones stock quote

Commands are a little more difficult than with The Source or CompuServe, in part because it uses symbols. It's also a big advantage to know the stock symbol of any company you want information on. Dow Jones charges $60/hr prime time for most services and $12/hr for evenings and weekends.

Dialog

Without doubt, Lockheed's Dialog Information Retrieval Service is the most powerful of the four we are examining. It is also the most expensive. Dialog serves largely as a middleman in providing access to more than 150 individual databases, with more than 55 million references. As a result, the charge per hour of connect time can vary from $30 to over $100.

Databases available include scientific and technical journals, newspapers, magazines, books, patents, trade publications, corporate reports, economic indexes, statistical data and others too numerous to mention. A user can search and retrieve records by keywords, publication, author, date or any one of a number of other categories. Normally, a record consists of the abstract of an article, along with bibliographic data on its source. If the full text of an article is needed, Dialog allows a user to order reprints on-line from outside suppliers, who will mail documents out within a matter of days.

The commands used in Dialog are typically English words that narrow a search using Boolean operations. Because of the system's flexibility, there are a large number of terms that must be learned to make full use of its capabilities. Fortunately, each of the databases within Dialog uses largely the same set of commands. The documentation for Dialog is excellent, and contains detailed descriptions of the individual databases as well as the overall system. There are no membership or minimum monthly fees for Dialog.

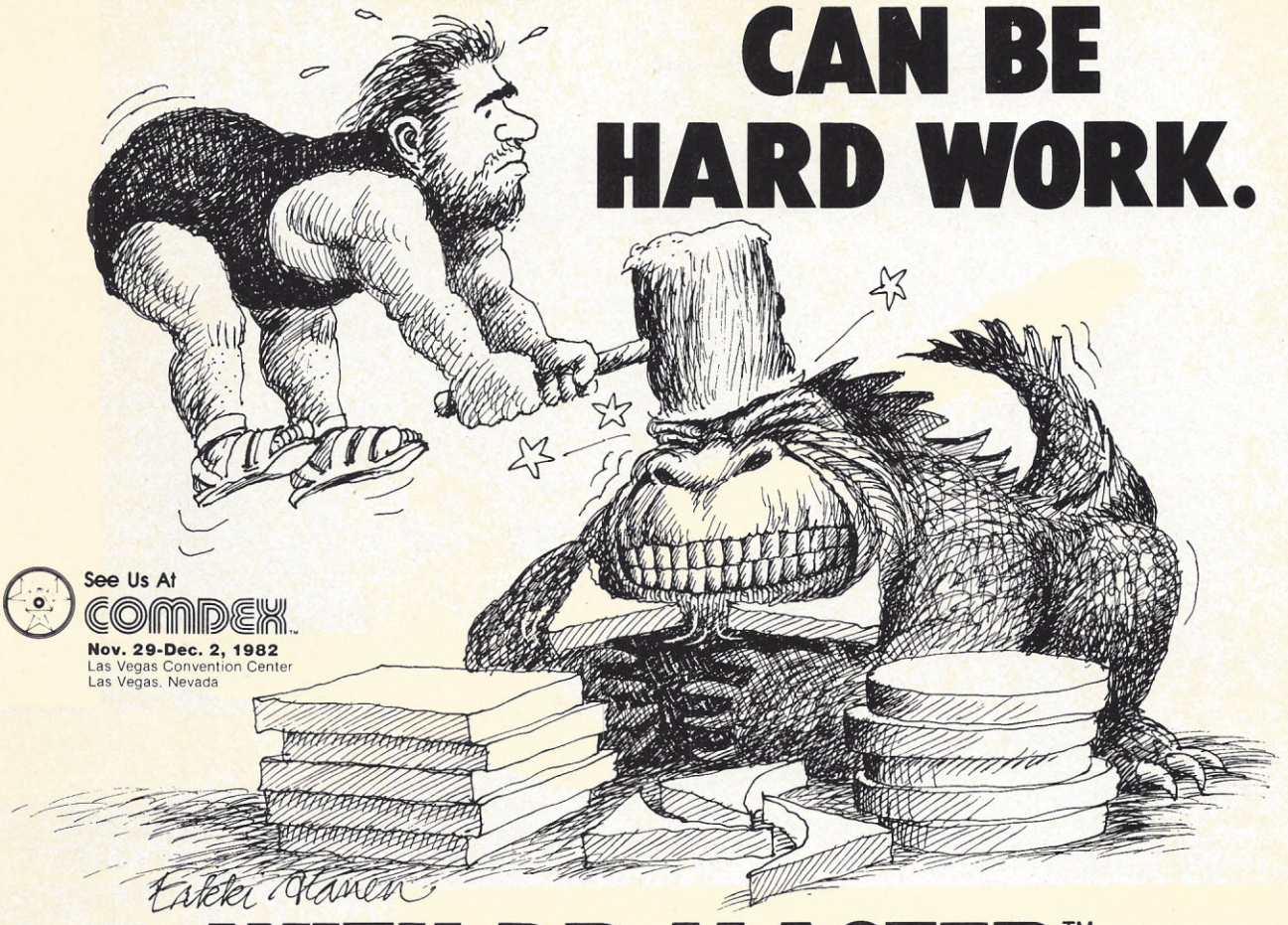
Putting the services to work

There are countless business applications of on-line information retrieval. Here are three hypothetical scenarios in which one of the information services could be put to use.

Scenario 1: You're considering investing in Storage Technology Corporation, and you'd like all the relevant information you can get on the company. Using Dow Jones News Retrieval, you access the stock quote reporter service. You key in ";1STK 82 M", to get a monthly report of Storage Technology's performance in 1982 (see figure 1). You then turn to Disclosure II to get more detailed information about the company. After getting a list of options, you decide you want a corporate profile, an income statement for the last three years and a listing of officers (figure 2). Finally, you refer to Corporate Earnings Estimator to get a

Continued on page 182

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CIRCLE NO. 80 ON INQUIRY CARD

Purchasing an Aircraft for Business



by Paul Garrison



Adding an aircraft to a company's arsenal of business machines can be a progressive step, but such a purchase must be carefully justified in terms of monetary benefit.

Despite all our sophisticated means of instant electronic communication, few important sales, contracts or agreements are ever finalized without an opportunity for the key negotiators to face one another on a person-to-person basis. There was a time when it was accepted practice for major businesses to locate their headquarters in a big city. Factories were close by and within easy travel distance. No longer. Now, that the relocation of factories and offices into less congested areas has become increasingly fashionable, the need for efficient on-demand transportation is more important than ever. To justify aircraft ownership, a company need not be a multi-national corporation with gross sales running to astronomical figures. A farsighted company with reasonable growth potential will realize unexpected opportunities once an aircraft is added to the list of business machines.

The difficulty facing executives interested in aircraft acquisition, is to justify that expenditure vis-a-vis the accountant or company comptroller who, more often than not, never travels at all and who has no personal interest in aircraft or aviation. To determine whether an airplane will actually improve productivity, based on the current and projected travel needs of the company, and whether or not it would be economical in comparison with whatever means of transportation are currently used involves a myriad of calculations. A computer can perform these calculations in seconds, assuming that an adequate program has been developed.

The accompanying program, for the Apple II Plus, will perform this function. It consists of three separate routines designed to produce three different types of results. One program asks the operator to key in the known or projected travel needs of the company, in order to determine the minimum type of aircraft that will efficiently serve those needs. It does not suggest specific makes or models of aircraft, as such decisions are likely to be influenced by personal preferences of those with the responsibility of making a purchase decision.

The second program determines the cost of operating the selected aircraft, using the manufacturer's published performance parameters. Taking into account the annual hours of use of the aircraft, the average speed, the average number of passengers, the fixed and variable costs per hour, the company tax bracket and other considerations, it calculates the gross and net cost per year, the gross and net cost per hour, per aircraft mile, per passenger mile, and so on.

The third program attempts to place a dollar evaluation on ten categories of benefits that tend to result from aircraft ownership. The relative importance of

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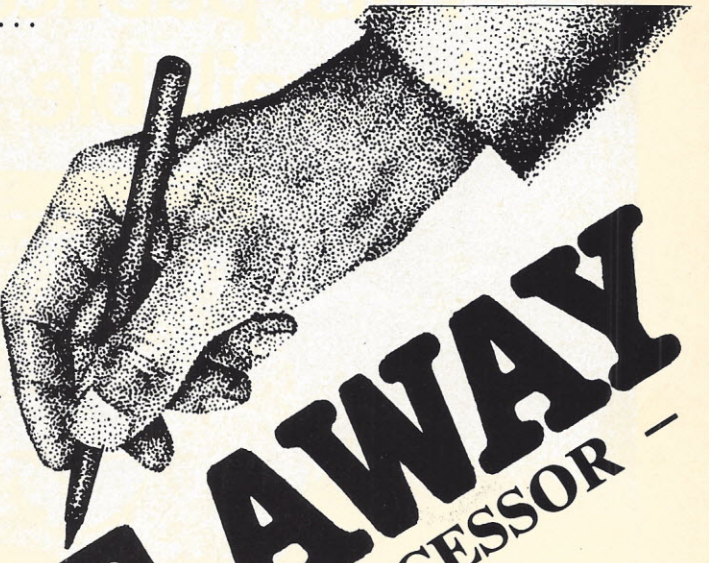
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these various benefits is loaded into the program based on known averages, but can be changed by the operator to conform with the evaluation of these benefits relative to the company in question.

The three programs interact with one another, each using variable data entered by the user and used repeatedly in all three programs. Any one program can be called up at will and in any order, with no need to go through all of them in succession. Different types of aircraft with differing performance parameters can be evaluated in quick succession in order to arrive at comparative figures, something which is easy to accomplish with the use of a line-printer.

Guide to program lines

The program is reproduced step-by-step. Lines 100 through 210 clear the screen and assign several repeatedly-used strings to letter combinations.

```
SELECT ONE OF THREE PROGRAMS
--------------------------------
DO TRAVEL NEEDS JUSTIFY AIRCRAFT
ACQUISITION? TYPE 1
--------------------------------
DETERMINE COST OF AIRCRAFT
OPERATION.  TYPE 2
--------------------------------
EVALUATE BENEFITS. TYPE 3  1
--------------------------------


KEY IN TRAVEL NEEDS.
--------------------------------

AVERAGE TRIP (MILES)?  550
HOW MANY TOTAL TRIPS (YEAR)?  78
LONGEST TRIPS MADE
OCCASIONALLY (MILES)?  1200
HOW MANY SUCH TRIPS?  7
AVERAGE NO. OF PASSENGERS?  4
NIGHT OR IFR NEEDED? (YES/NO)  YES

MULTI-ENGINE SUGGESTED
PRESSURIZATION SUGGESTED
YOU MAY NEED TWO AIRCRAFT
CABIN-SIZE TWIN SUGGESTED
--------------------------------


TO DETERMINE AVERAGE TRIP
TIMES FOR DIFFERENT TYPES
OF AIRCRAFT, KEY IN THE
DIFFERENT CRUISE SPEEDS  225
--------------------------------
AVERAGE TRIP: 2.24 HRS.MIN.
LONG TRIP: 5.18 HRS.MIN.
HOURS PER YEAR BASED ON
PREVIOUSLY ENTERED DATA  421 HOURS
--------------------------------
```

Figure 1. Sample run for first program.

```
SELECT ONE OF THREE PROGRAMS
--------------------------------
DO TRAVEL NEEDS JUSTIFY AIRCRAFT
ACQUISITION? TYPE 1
--------------------------------
DETERMINE COST OF AIRCRAFT
OPERATION.  TYPE 2
--------------------------------
EVALUATE BENEFITS. TYPE 3  2
--------------------------------


NO. OF USERS?  15
AIRCRAFT HOURS/YEAR?  500
AVERAGE CRUISE SPEED?  225
AVERAGE NO. OF PASSENGERS?  4
NO. OF AIRCRAFT TRIPS?  75
NO. OF TRIPS BY CO. PERSONNEL?  215
NO. OF TRIPS BY CUSTOMERS?  78
ESTIM. NO. MAN HOURS SAVED?  650
ESTIM. $-VALUE PER MAN-HOUR?  200
$-VALUE OF NOT USED AIRLINES?  6500
$-VALUE OF RON'S SAVED?  3500
CO. TAX BRACKET?  45
FIXED COSTS/AIRCRAFT HOUR?  80
VARIABLE COSTS/AIRCR. HR.?  50
--------------------------------
TOTAL AIRCRAFT MILES: 112500
TOTAL PASSENGER MILES:  450000
PRE-TAX COST PER HOUR: $130
PRE-TAX COST PER YEAR: $55000
COST/YEAR AFTER TAXES: $30250
COST/HOUR AFTER TAXES: $60.5
COST PER AIRCRAFT MILE: $.27
COST PER PASSENGER MILE: $.07
DOLLAR VALUE/HOURS SAVED: $130000
COST PER AUTHORIZED USER: $2016.67
DO YOU WANT TO REPEAT? (Y/N)  N
--------------------------------
END
--------------------------------
```

Figure 2. Sample run for second program.

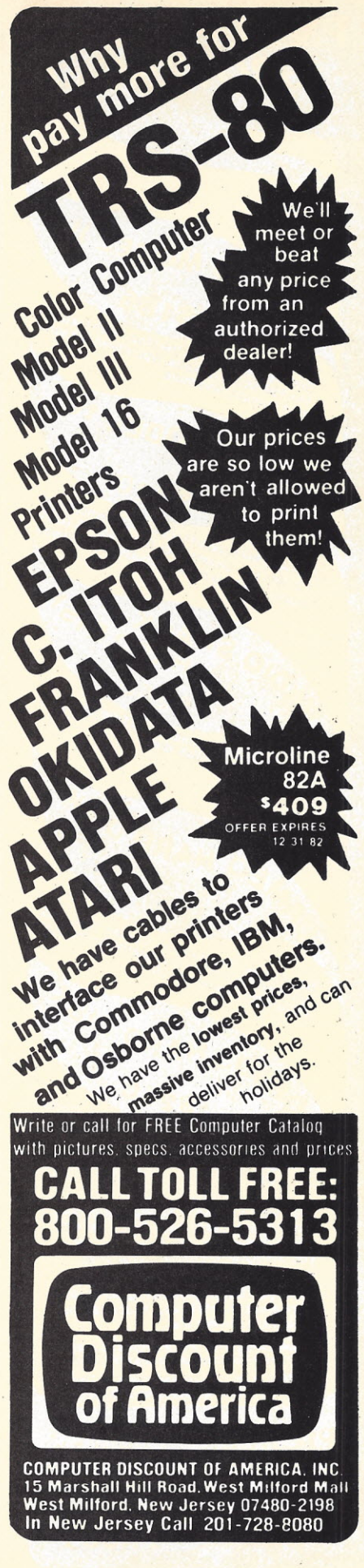
The FOR/TO/PRINT/NEXT loop is used repeatedly to place blank space into display, making it easier to read.

Lines 1000 to 1240 provide the operator with an opportunity to decide which of the three programs is to be run.

Lines 10000 through 15310 constitute the first of the three programs, determining aircraft suitability based on the transportation requirements of a company. Lines 15205 and 15225 convert decimal hours into hours and minutes. Lines 15000 through 15300 provide an opportunity to compare trip times and the total flying hours per year, using different aircraft-performance parameters. At the end, the operator can ask to have the program run again, using different parameters.

Lines 20000 through 25340 represent the second program, determining the cost of operating a given aircraft. This program uses the INPUT statements of lines 31000 through 31310 and the computation sections in lines 32000 through 33120 to produce the answers that are placed into display in lines 25005 through 25300. Lines 25035, 55, 75, 125, 235, 255 and 295 are used to limit the displayed decimals to two (cents).

Lines 30000 through 34480 comprise the third and final program, which incorporates the INPUT and computation sections used by it and the previous program. Lines 30000 through 30740 describe the benefits that can be derived through ownership of a company aircraft, and display the percentage figures attached to each, giving the operator an opportunity to change those figures and to substitute his own assessment.



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Lines 31000 through 31310 are the INPUT lines, and 32000 through 33120 the computation lines used before. Lines 34000 through 34039 are used to limit the number of displayed decimals and to compute the dollar value of each benefit category based on the previously determined values.

Lines 34040 through 34480 place the results into display and ask the operator whether or not the program is to be run again.

In the sample runs of the program, the following assumptions have been used: four or more passengers would be uncomfortable in anything smaller than a cabin-class twin; an average trip length of 500 or more miles can more economically be accomplished at high altitudes where pressurization is important; and if the aircraft is to make 40 or more trips in a year, that can best be accomplished with two aircraft, because periodic maintenance would otherwise interfere with scheduling. Based on these assumptions and the travel needs of the company, the program suggests one or more multi-

Aircraft suitability is based on many variable conditions.

engine aircraft, at least one of which should be pressurized and of cabin class for added comfort. (Average trip distance is 550 miles, with a total of 78 trips per year anticipated; the longest trip flown with any degree of frequency being 1,200 miles, with seven such trips expected. Average number of passengers carried is four, including the pilot if the aircraft is flown by a company executive, but excluding the crew if the aircraft is professionally flown. All-weather capability is needed.) Under other conditions, the program might display SINGLE-ENGINE ACCEPTABLE, MINIMUM RANGE WITH IFR RESERVES and that range, and TURBINE AIRCRAFT SUGGESTED.

In the final portion of the program, it is assumed that the average cruising speed of an appropriate aircraft is 225 knots, producing the reproduced results in terms of times enroute and total hours per year.

In the second program, no arbitrary assumptions are made. The program simply uses keyed-in data to produce the results in terms of total aircraft miles, total passenger miles, pre-tax and after-tax costs per year, per hour, per mile and per passenger mile, the dollar value of savings in executive time and the cost of aircraft operation per authorized user. When data are input, the estimated value

Program listing

```
120 TS$ = "TIME SAVED BY USING BUSINESS AIRCRAFT"
130 RE$ = "RELIABILITY OF AVAILABLE TRANSPORTATION"
140 CO$ = "CONTROL OVER FACILITIES AWAY FROM HOME"
150 PR$ = "PRIVACY WHILE TRAVELING"
160 ES$ = "PRESTIGE ATTACHED TO AIRCRAFT OWNERSHIP"
170 FL$ = "SCHEDULING FLEXIBILITY"
180 SA$ = "SAFETY, INCLUDING TERRORISM PROTECTION"
190 MF$ = "MISC. FRINGE BENEFITS"
200 MA$ = "MARKETING ADVANTAGES"
210 PE$ = "ABILITY TO ATTRACT TOP-LEVEL PERSONNEL"
1000  GOSUB 7000
1010  PRINT "SELECT ONE OF THREE PROGRAMS"
1020  GOSUB 8000
1030  PRINT "DO TRAVEL NEEDS JUSTIFY AIRCRAFT"
1040  PRINT "ACQUISITION? TYPE 1"
1050  GOSUB 8000
1060  PRINT "DETERMINE COST OF AIRCRAFT"
1070  PRINT "OPERATION.  TYPE 2"
1080  GOSUB 8000
1090  INPUT "EVALUATE BENEFITS. TYPE 3  ";A
1100  GOSUB 8000
1110  GOSUB 7000
1120  IF A = 1 THEN 10000
1130  IF A = 2 THEN 20000
1140  IF A = 3 THEN 30000
3000  GOSUB 7000
7000  HOME
7010  FOR X = 1 TO 6
7020  PRINT
7030  NEXT X
7040  RETURN
8000  PRINT "--------------------------------"
8010  RETURN
9000  FOR PAUSE = 1 TO 1500
9010  NEXT PAUSE
9020  RETURN
10000  GOSUB 7000
10010  PRINT "KEY IN TRAVEL NEEDS."
10020  GOSUB 8000
10030  PRINT
10000  INPUT "AVERAGE TRIP (MILES)?  ";ZN
10100  INPUT "HOW MANY TOTAL TRIPS (YEAR)?  ";ZA
10120  INPUT "LONGEST TRIPS MADE OCCASIONALLY (MILES)?";ZL
10140  INPUT "HOW MANY SUCH TRIPS?  ";ZB
10160  INPUT "AVERAGE NO. OF PASSENGERS?  ";ZP
10180  INPUT "NIGHT OR IFR NEEDED? (YES/NO)  ";ZI$
10300  GOSUB 7000
10330  IF ZI$ = "YES" THEN 10360
10340  PRINT "SINGLE ENGINE ACCEPTABLE"
10350  GOTO 10370
10360  PRINT "MULTI-ENGINE SUGGESTED"
10370  PRINT
10380  IF ZN =  > 500 THEN 10500
10390  IF ZA =  > 40 THEN 10600
10400  IF ZP =  > 4 THEN 10700
10410  IF ZB =  > 12 THEN 10800
10420  GOTO 10835
10500  GOSUB 7000
10510  PRINT "PRESSURIZATION SUGGESTED"
10515  GOSUB 9000
10520  GOTO 10390
10600  GOSUB 7000
10610  PRINT "YOU MAY NEED TWO AIRCRAFT"
10615  GOSUB 9000
10620  GOTO 10400
10700  GOSUB 7000
10710  PRINT "CABIN-SIZE TWIN SUGGESTED"
10715  GOSUB 9000
10720  GOTO 10410
10800  GOSUB 7000
10810  PRINT "MINIMUM RANGE WITH IFR RESERVES: ";ZL
10820  GOSUB 7000
10830  PRINT "TURBINE AIRCRAFT SUGGESTED"
10835  GOSUB 9000
10840  GOSUB 8000
10845  INPUT "TO CONTINUE, PRESS 0  ";Z
10850  IF Z = 0 THEN 15000
10915  GOSUB 9000
15000  GOSUB 7000
15030  PRINT "TO DETERMINE AVERAGE TRIP"
15050  PRINT "TIMES FOR DIFFERENT TYPES"
15070  PRINT "OF AIRCRAFT, KEY IN THE"
15090  INPUT "DIFFERENT CRUISE SPEEDS  ";KT
15100  HM = ZN / KT
15110  HS = ZL / KT
15120  HY = ZN * ZA:J = (ZL * ZB) - (ZN * ZB)
       :J = J + HY:HY = J / KT:HY = HY * 2
15130  GOSUB 8000
15205  HM =  INT (HM * 10 + .5) / 10:HX =
       INT (HM):XH = (HM - HX) * .6:HM = HX + XH
15210  PRINT "AVERAGE TRIP: ";HM;" HRS.MIN."
15225  HS =  INT (HS * 10 + .5) / 10:HX =
       INT (HS):XH = (HS - HX) * .6:HS = HX + XH
15230  PRINT "LONG TRIP: ";HS;" HRS.MIN."
15250  PRINT "HOURS PER YEAR BASED ON"
15265  HY =  INT (HY)
15270  PRINT "PREVIOUSLY ENTERED DATA  ";HY;" HOURS"
15280  GOSUB 8000
15290  INPUT "FOR A REPEAT, PRESS 0  ";Z
15300  IF Z = 0 THEN 15000
15310  GOTO 62000
20000  GOSUB 7000
20030 O = 2
20040  GOTO 31030
25000  GOSUB 8000
25005  PRINT "TOTAL AIRCRAFT MILES: ";NM
25020  PRINT "TOTAL PASSENGER MILES:  ";PM
```



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CIRCLE NO. 103 ON INQUIRY CARD

Figure 3. Sample run for third program.

```
SELECT ONE OF THREE PROGRAMS
--------------------------------
DO TRAVEL NEEDS JUSTIFY AIRCRAFT
ACQUISITION? TYPE 1
--------------------------------
DETERMINE COST OF AIRCRAFT
OPERATION.  TYPE 2
--------------------------------
EVALUATE BENEFITS. TYPE 3  3
--------------------------------


EACH CATEGORY OF BENEFITS IS GIVEN
A PERCENTAGE VALUE, BASED ON
AVERAGE ASSESSMENT.  YOU MAY
CHANGE THOSE VALUES BY TYPING IN
YOUR OWN ASSESSMENT.
OTHERWISE, TYPE 0 TO GO ON.
--------------------------------
TIME SAVED BY USING BUSINESS
AIRCRAFT,    20% ?0
--------------------------------
RELIABILITY OF AVAILABLE
TRANSPORTATION, 18% ?0
--------------------------------
CONTROL OVER FACILITIES AWAY FROM
HOME, 16% ?0
--------------------------------
PRIVACY WHILE TRAVELING, 13% ?0
--------------------------------
PRESTIGE ATTACHED TO AIRCRAFT
OWNERSHIP, 10% ?0
--------------------------------
SCHEDULING FLEXIBILITY, 9% ?0
--------------------------------
SAFETY, INCLUDING TERRORISM
PROTECTION, 7% ?0
--------------------------------
MISC. FRINGE BENEFITS, 4% ?0
--------------------------------
MARKETING ADVANTAGES, 2% ?0
--------------------------------
ABILITY TO ATTRACT TOP-LEVEL
PERSONNEL, 1% ?0
--------------------------------


NO. OF USERS?  15
AIRCRAFT HOURS/YEAR?  500
AVERAGE CRUISE SPEED?  225
AVERAGE NO. OF PASSENGERS?  4
NO. OF AIRCRAFT TRIPS?  75
NO. OF TRIPS BY CO. PERSONNEL?  255
NO. OF TRIPS BY CUSTOMERS?  78
ESTIM. NO. MAN HOURS SAVED?  650
ESTIM. $-VALUE PER MAN-HOUR?  200
$-VALUE OF NOT USED AIRLINES?  6500
$-VALUE OF RON'S SAVED?  3500
CO. TAX BRACKET?  45
FIXED COSTS/AIRCRAFT HOUR?  80
VARIABLE COSTS/AIRCR. HR.?  50


TIME SAVED BY USING BUSINESS AIRCRAFT
$9.31 PER HOUR SAVED
RELIABILITY OF AVAILABLE TRANSPORTATION
$16.35 PER PASSENGER TRIP
CONTROL OVER FACILITIES AWAY FROM HOME
$64.53 PER AIRCRAFT TRIP
PRIVACY WHILE TRAVELING
$1.97                PER FLIGHT HOUR
PRESTIGE ATTACHED TO AIRCRAFT OWNERSHIP
$3025 PER YEAR
SCHEDULING FLEXIBILITY
$8.18 PER PASSENGER TRIP
SAFETY, INCLUDING TERRORISM PROTECTION
$28.23 PER AIRCRAFT TRIP
MISC. FRINGE BENEFITS
$80.67 PER USER
MARKETING ADVANTAGES
$7.76 PER CUSTOMER
ABILITY TO ATTRACT TOP-LEVEL PERSONNEL
$4.03 PER LANDING
TO REPEAT, PRESS 0  9
--------------------------------
END
--------------------------------
```

of executive time per hour should be the productive value of the person to the company, not his or her hourly wage. RONs (rest overnight) should include room, board, rental cars and incidentals away from home base that would have been necessary without company-aircraft availability. Fixed costs should include amortization of aircraft purchase cost, mortgage interest, insurance, scheduled and unscheduled maintenance, hangarage, and all other costs not directly associated with the operation of the airplane. Variable costs are such things as fuel, oil, landing fees and tiedowns.

In the third program, the assumptions are the dollar values attached to the categories of benefits, assumptions that can be changed by the operator (keying in 0 retains the assumed values; keying in another figure changes the values to that figure). The remaining INPUT information is the same as above.□

Paul Garrison of Santa Fe, NM, has authored a number of programs for pilots, business and corporate flight departments, air-taxi charter and fleet operators. He is currently writing a series of books on microcomputers in various business applications.

Program listing (continued)

```
25035 GC =  INT (GC * 100 + .5) / 100
25040  PRINT "PRE-TAX COST PER HOUR: $";TC
25055 TC =  INT (TC * 100 + .5) / 100
25060  PRINT "PRE-TAX COST PER YEAR: $";GC
25075 NC =  INT (NC * 100 + .5) / 100
25080  PRINT "COST/YEAR AFTER TAXES: $";NC
25125 AH =  INT (AH * 100 + .5) / 100
25220  PRINT "COST/HOUR AFTER TAXES: $";AH
25235 AM =  INT (AM * 100 + .5) / 100
25240  PRINT "COST PER AIRCRAFT MILE: $";AM
25255 PN =  INT (PN * 100 + .5) / 100
25260  PRINT "COST PER PASSENGER MILE: $";PN
25280  PRINT "DOLLAR VALUE/HOURS SAVED: $";HR
25295 CU =  INT (CU * 100 + .5) / 100
25300  PRINT "COST PER AUTHORIZED USER: $";CU
25320  INPUT "DO YOU WANT TO REPEAT? (Y/N)  ";Y$
25330  IF Y$ = "Y" THEN 20000
25340  GOTO 62000
30000  GOSUB 7000
30025 TS = 5:RE = 5:CO = 5:PR = 5:ES = 5:FL
      = 5:SA = 5:MF = 5:MA = 5:PE = 5
30026 Q = 3
30030  PRINT "EACH CATEGORY OF BENEFITS IS GIVEN"
30050  PRINT "A PERCENTAGE VALUE, BASED ON"
30070  PRINT "AVERAGE ASSESSMENT.  YOU MAY"
30090  PRINT "CHANGE THOSE VALUES BY TYPING IN"
30110  PRINT "YOUR OWN ASSESSMENT."
30130  PRINT "OTHERWISE, TYPE 0 TO GO ON."
30140  GOSUB 8000
30160  PRINT TS$;",    20% ";
30165  INPUT TS
30170  IF TS <  > 0 THEN 30190
30180 TS = 20
30190  GOSUB 8000
30220  PRINT RE$;", 18% ";
30225  INPUT RE
30230  IF RE <  > 0 THEN 30250
30240 RE = 18
30250  GOSUB 8000
30280  PRINT CO$;", 16% ";
30285  INPUT CO
30290  IF CO <  > 0 THEN 30310
30300 CO = 16
30310  GOSUB 8000
30340  PRINT PR$;", 13% ";
30345  INPUT PR
30350  IF PR <  > 0 THEN 30370
30360 PR = 13
30370  GOSUB 8000
```

```
30400  PRINT ES$;", 10% ";
30405  INPUT ES
30410  IF ES <  > 0 THEN 30430
30420 ES = 10
30430  GOSUB 8000
30460  PRINT FL$;", 9% ";
30465  INPUT FL
30470  IF FL <  > 0 THEN 30490
30480 FL = 9
30490  GOSUB 8000
30520  PRINT SA$;", 7% ";
30525  INPUT SA
30530  IF SA <  > 0 THEN 30550
30540 SA = 7
30550  GOSUB 8000
30580  PRINT MF$;", 4% ";
30585  INPUT MF
30590  IF MF <  > 0 THEN 30610
30600 MF = 4
30610  GOSUB 8000
30640  PRINT MA$;", 2% ";
30645  INPUT MA
30650  IF MA <  > 0 THEN 30670
30660 MA = 2
30670  GOSUB 8000
30700  PRINT PE$;", 1% ";
30705  INPUT PE
30710  IF PE <  > 0 THEN 30730
30720 PE = 1
30730  GOSUB 8000
31000  GOSUB 7000
31030  INPUT "NO. OF USERS?  ";US
31050  INPUT "AIRCRAFT HOURS/YEAR?  ";HY
31070  INPUT "AVERAGE CRUISE SPEED?  ";CS
31090  INPUT "AVERAGE NO. OF PASSENGERS?  ";PX
31110  INPUT "NO. OF AIRCRAFT TRIPS?  ";TR
31130  INPUT "NO. OF TRIPS BY CO. PERSONNEL? ";PT
31150  INPUT "NO. OF TRIPS BY CUSTOMERS?  ";CT
31170  INPUT "ESTIM. NO. MAN HOURS SAVED?  ";MH
31190  INPUT "ESTIM. $-VALUE PER MAN-HOUR?  ";VH
31220  INPUT "$-VALUE OF NOT USED AIRLINES?  ";AS
31240  INPUT "$-VALUE OF RON'S SAVED?  ";RS
31260  INPUT "CO. TAX BRACKET?  ";TB
31290  INPUT "FIXED COSTS/AIRCRAFT HOUR?  ";FC
31310  INPUT "VARIABLE COSTS/AIRCR. HR.?  ";VC
32000  GOTO 33000
32030 TS = (NC / MH) * (TS / 100)
32040 RE = (NC / (PT + CT)) * (RE / 100)
32050 CO = (NC / TR) * (CO / 100)
32060 PR = ((NC / HY) / PX) * (PR / 100)
32070 ES = NC * (ES / 100)
32080 FL = (NC / (PT + CT)) * (FL / 100)
32090 SA = (NC / TR) * (SA / 100)
32100 MF = (NC / US) * (MF / 100)
32110 MA = (NC / CT) * (MA / 100)
32120 PE = (NC / TR) * (PE / 100)
32130  GOTO 34000
33000 NM = HY * CS
33010 PM = PX * (HY * CS)
33020 TC = FC + VC
33030 SS = (VH * MH) + AS + RS
33040 GC = (TC * HY) - AS - RS
33050 NC = GC - (GC * (TB / 100))
33060 AH = NC / HY
33070 AM = NC / NM
33080 PN = NC / PM
33090 HR = VH * MH
33100 CU = NC / US
33110  IF Q = 3 THEN 32030
33120  IF Q = 2 THEN 25000
34000  GOSUB 7000
34030 TS =  INT (TS * 100 + .5) / 100
34031 RE =  INT (RE * 100 + .5) / 100
34032 CO =  INT (CO * 100 + .5) / 100
34033 PR =  INT (PR * 100 + .5) / 100
34034 ES =  INT (ES * 100 + .5) / 100
34035 FL =  INT (FL * 100 + .5) / 100
34036 SA =  INT (SA * 100 + .5) / 100
34037 MF =  INT (MF * 100 + .5) / 100
34038 MA =  INT (MA * 100 + .5) / 100
34039 PE =  INT (PE * 100 + .5) / 100
34040  GOSUB 7000
34045  PRINT TS$
34060  PRINT "$";TS;" PER HOUR SAVED"
34080  PRINT RE$
34100  PRINT "$";RE;" PER PASSENGER TRIP"
34120  PRINT CO$
34140  PRINT "$";CO;" PER AIRCRAFT TRIP"
34160  PRINT PR$
34180  PRINT "$";PR," PER FLIGHT HOUR"
34200  PRINT ES$
34220  PRINT "$";ES;" PER YEAR"
34270  PRINT FL$
34290  PRINT "$";FL;" PER PASSENGER TRIP"
34310  PRINT SA$
34330  PRINT "$";SA;" PER AIRCRAFT TRIP"
34350  PRINT MF$
34370  PRINT "$";MF;" PER USER"
34390  PRINT MA$
34410  PRINT "$";MA;" PER CUSTOMER"
34430  PRINT PE$
34450  PRINT "$";PE;" PER LANDING"
34470  INPUT "TO REPEAT, PRESS 0  ";Z
34480  IF Z = 0 THEN 30000
62000  GOSUB 8000
62010  PRINT "END"
62020  GOSUB 8000
62030  END
```

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CIRCLE NO. 39 ON INQUIRY CARD

Systems Groups' Three-Board S-100 Computer

by Roger H. Edelson

This flexible configuration provides users with a functional alternative to single board designs.

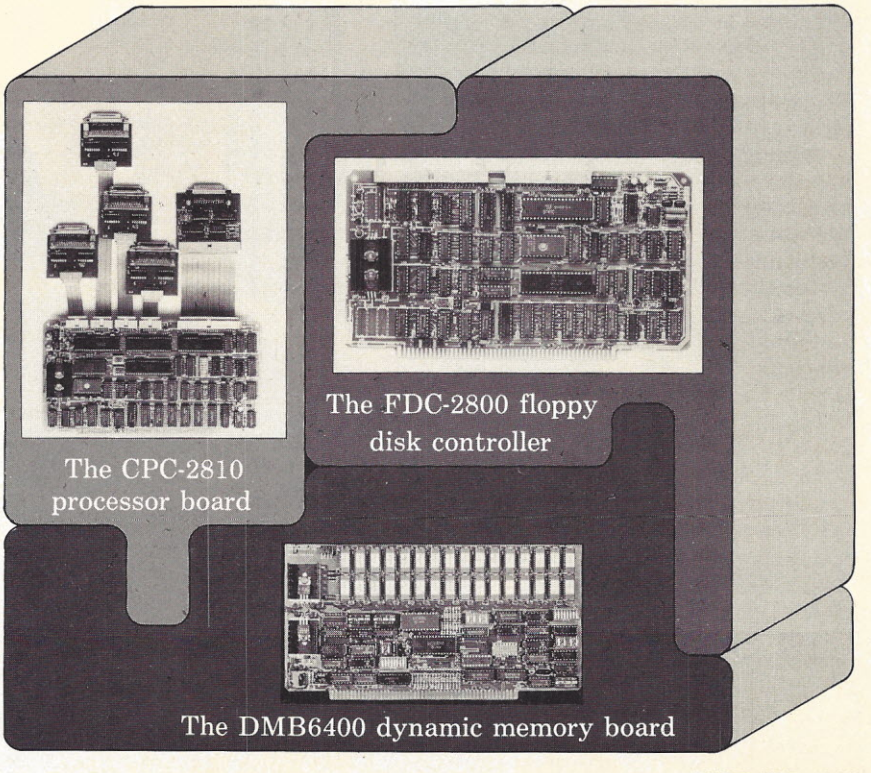
The newly-released three S-100 bus card set from Systems Group (Orange, CA) forms a high quality, 4 MHz (or 2 MHz), 64K byte, S-100 bus-compatible computer, supporting either 5.25-in. or 8-in. disk drives running either CP/M, MP/M or Oasis. The boards work well, are exceptionally well built and affordable.

All the boards are built using double-sided glass epoxy pc board construction, with gold-plated edge connectors, and adequate silk-screened component identification and full two-sided solder masking. For additional reliability, the boards are fully tested and burned-in prior to shipment. For ease of servicing, all IC's are socket-mounted (not just the expensive CPU, controller and memory chips) using quality double-sided or gas-tight contacts. The boards come with a full-year warranty including parts and labor.

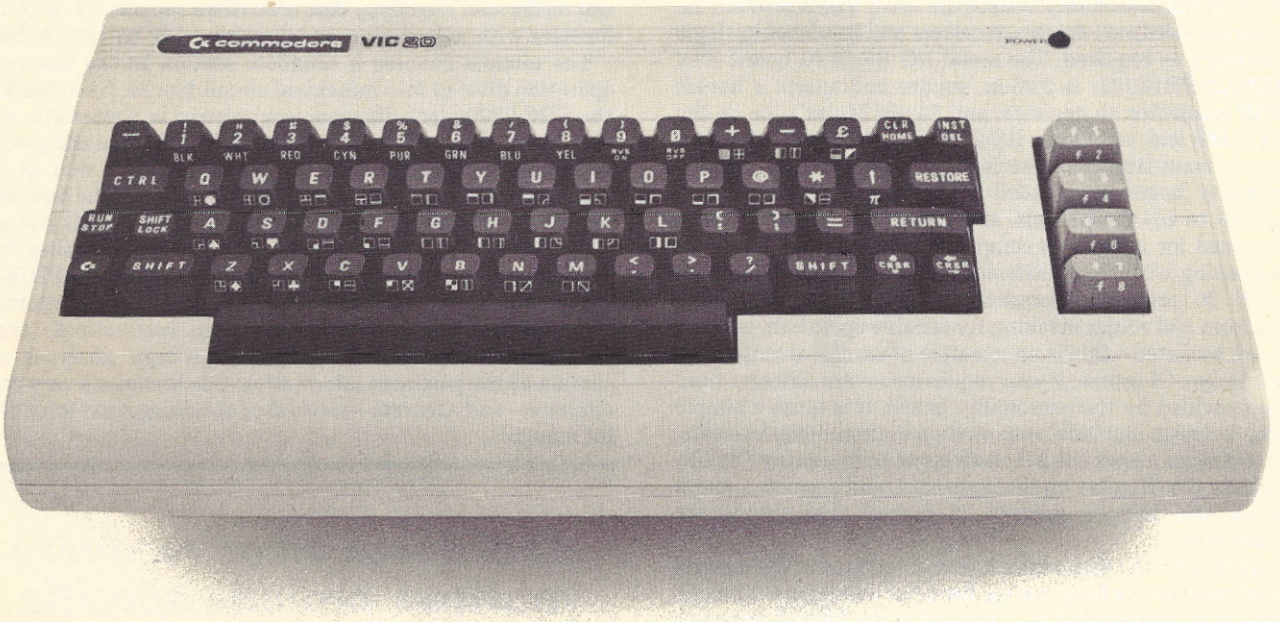
The manuals are comprehensive and user-oriented, containing functional descriptions, coverage of the theory of operation, board layout drawings, as well as full electrical schematic diagrams. Application notes are included to aid in configuring and adapting the cards for use with other Systems Group boards, or products from other S-100 Bus manufacturers. While the specifications state that the cards are S-100 bus-compatible, the specific subgroups of the proposed S-100 specification (IEEE-696) are not listed. The void is particularly noticeable in the case of the DMB6400 64K byte memory. Without this information, interfacing with non-specific boards can be somewhat difficult. The DMB6400 board was, in all fairness, designed over two years ago, before the proposed IEEE Standard had been released. As yet, IEEE 696 has not been approved; most responsible manufacturers try to meet its requirements.

The processor board, CPC-2810, contains a Z80A microprocessor, a real-time clock, four asynchronous/synchronous (user option) serial I/O channels and two parallel I/O channels. In addition, it provides a socket for a user-supplied EPROM, either a 2708, a 2716 or the newer 2732 may be used—a jumper area is provided to customize the board for the selected EPROM. By the way, the hardware jumper options—and there are many—are very easy to locate within the manual—each one has it's own section number, listed in the Table of Contents. The board provides the ability for user configuration of the power on jump to any 100H address, which makes it a pleasure to use when configuring with my North Star disk controller that insists on residing at E800H.

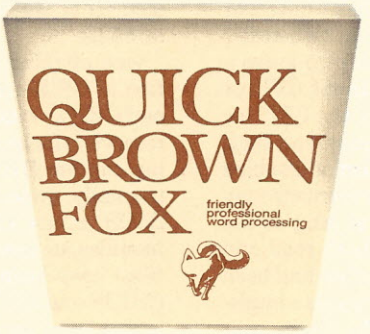
A list of all the user hardware/software configurable options is really beyond the scope of this review, but they are sufficient to allow interfacing the board with almost any combination of S-100 bus compatible cards (post IEEE-696) you are likely to find. In particular, three different implementations of PDBIN timing are jumper selectable—from full IEEE 696 compatibility to almost zero delay with respect to the Z80A-generated timing signal. The baud rates on the serial channel are programmable by means of the Z80-CTC circuit, and allow each channel to have independent rates—from 18.75 baud to 38,400 baud internally, and up to 50 Kbaud with an externally-supplied clock. The section in the manual covering programming the CTC for the desired baud rates only lists programming values for the 75 baud to 38,400 baud range, but it was only intended as a sample. Besides, who needs baud rates slower than 75 baud? The serial I/O will operate either in the asynchronous mode (RS-232C) or synchronously, supporting programmed I/0, interrupt, or block transfer operations in either mode. In the synchronous mode, which is obtained by substituting a SIO IC for the DART chip on the board, baud rates from 18.75 to 614,480 baud are available with the internal clock. With an externally supplied clock, the synchronous channel can reach 800 Kbaud. The IC substitution to configure the



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CIRCLE NO. 30 ON INQUIRY CARD

serial I/O channel for synchronous operation is particularly simple as the two chips are both pin and program compatible.

To allow even greater system flexibility, both the serial and parallel I/0 controllers exit the board directly from the LSI chips. To tailor the interface to the exact device requirements, small external personality boards are used, which provide the appropriate hardware drivers, receivers and handshaking logic on circuitry as required. The serial I/O RS-232C board (P/N NMRS232-PBIO101) is 2.25-in. square and sports a female DB25P connector on one side, and 14 pin Molex type on the other. 1488 and 1489 type RS-232 IC's have been used and adequate noise/transient filtering is provided. This particular personality board is intended for communication from the computer to any peripherals, and a second model (PBIO102) is designed for modem to computer interfacing.

In keeping with the specifications, and design goals of the larger S-100 cards, these personality boards also use gold-plated connectors and solder masking for reliable operation, and the IC's are socketed—this is an example of careful attention-to-detail design. Of course, if your requirements are different from those provided by the personality board, it is quite a simple matter to design and build your own via a current-loop interface. This technique allows the I/O channels to be extremely flexible, minimizes the circuitry on the main card, and does not require cut-etch and jumper surgery, if special applications are encountered.

You can't just let these little boards lie around in the innards of your computer, or hang out the back end waving in the breeze. After a little experimentation, I found that the DB25P connector on the serial board could be secured to the rear connector plate of my S-100 bus chassis, and all I lost was one card space inside. This space loss was no particular hardship, as the number of memory cards in my system was reduced from four to one by using the DMB6400 Memory board. In the near future, the company will provide personality boards for the RS-422 high-speed differential interface, so with this technique it is not necessary to scrap your expensive CPU board when changing interfaces.

The next board, the Floppy Disk Controller allows data transfer by either programmed I/O or DMA operations. The board utilizes a separate phase-locked-loop data separator to optimize reliability and data/media transportability. As an aid in multi-tasking environments, the FDC-2800 Disk Controller provides a 1K by 8-bit RAM sector buffer (using two static 2114 RAM chips) to allow the disk controller chip to move a 1024-byte block of data to or from the disk without CPU or S-100 Bus intervention. This sector buffer frees the CPU for other duties—rather than waiting for disk latency and data transfer times. As the sector buffer may be enabled or disabled through bit 1 of the control port, a full 64K-byte memory may still be maintained within the main computer, as long as the memory supports PHANTOM control during both read and write cycles. The FDC-2800 with its sector buffer has been optimized for the multi-user environment, but can also implement the programmed I/O data transfers of the single user CP/M operating system. An alternate board, the FDC-2801, was available for just the CP/M environment, but there was not sufficient demand to justify continued production, and cost savings were marginal.

These controllers will interface with up to four drives at a time, but they must all be of the same size. The drives may be either single- or double-sided, and the controller will write and read in both double-density and single-density IBM-compatible soft-sectored formats. The single density format is equivalent to the IBM 3740 8-in. standard. Write pre-compensation is selectable for either 0, 125 nS or 250 nS. The recommended values are 125 nS for the outer tracks, and 125 nS for the inner tracks. The late/early shift is determined by an algorithm within the NEC μPD765A controller chip. To be fully compatible with the various versions of CP/M and MP/M, and media size, the floppy disk controllers support soft sectored formats with sector sizes ranging from 128 to 1024 bytes.

The manual devotes a complete section to the theory of operation divided into individual circuit blocks. Each block of the FDC 2800 block diagram is numbered in agreement with this description, as shown in figure 2. The manual adequately details all of the hardware jumper options, as well as the required strapping for eight typical drives. All of the hardware jumper options can be made using the supplied BERG jumpers —there is no need to do any soldering or trace-cutting. The manual even includes the device specification for the μPD765A integrated circuit plus timing waveforms for the more important synchronous operations within the board. Interestingly, these waveforms were taken directly from a logic analyzer and contain all the pertinent information; this becomes a very cost-effective—and accurate—method of obtaining waveform data for manuals.

Additional error recovery routines provide specific information.

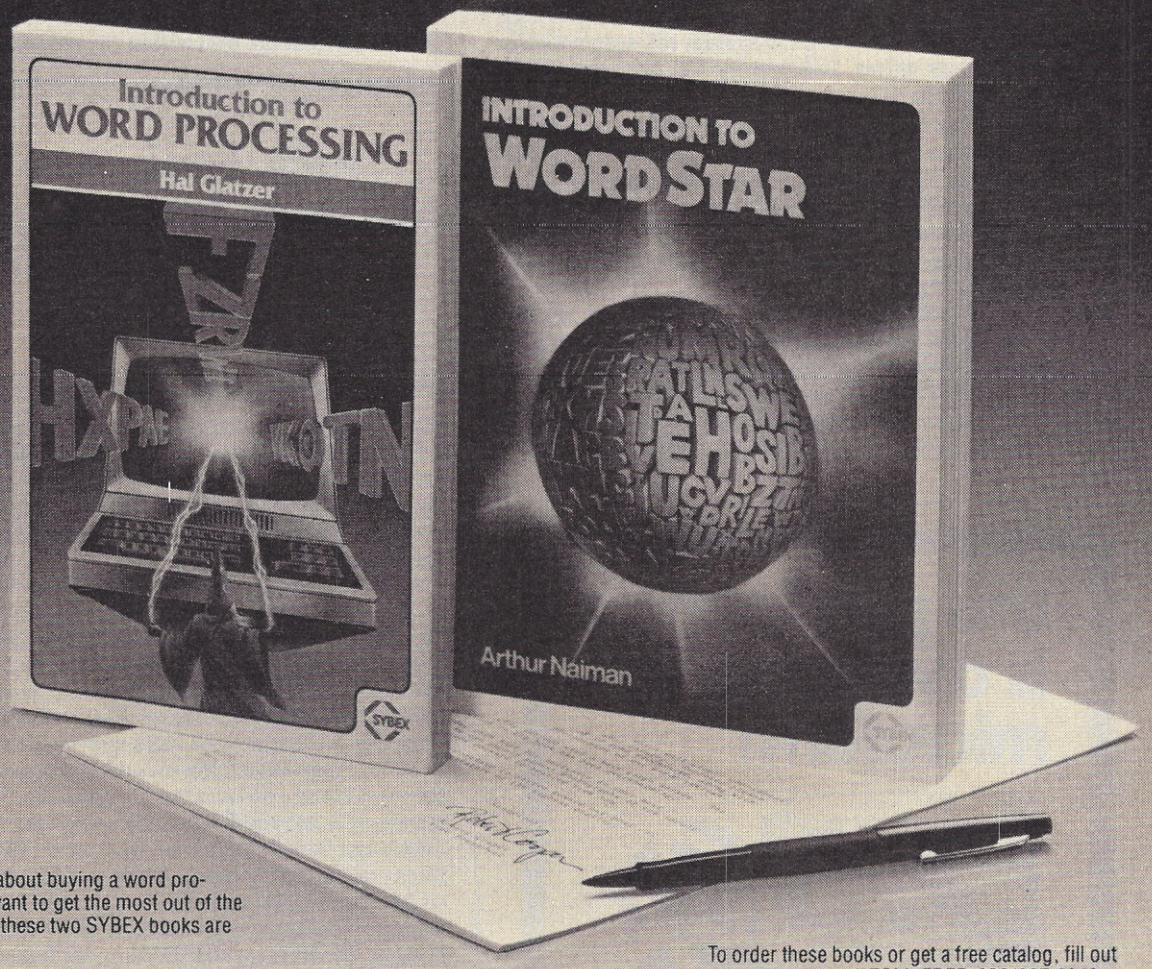
The documentation set includes the complete CP/M and MP/M manuals, as well as a 70-page guide for the Systems Group implementation of these operating systems. The FDC manual contains sample low level disk driver routines, and combined with the CBIOS and BDOS programs on the disk allows easy configuring, even for special systems. The CP/M and MP/M operating systems are not included with the boards; they must be purchased separately. CP/M costs $190 and version 1.1 of MP/M retails at $435, while MP/M version 2.0 lists at $585.

One attractive feature of the Systems Group implementation of CP/M—or MP/M—is the inclusion of the CCP, BDOS and CBIOS routines as ".SPR" files rather than stored on the reserved tracks of the diskette. This technique allows generating custom BIOS configurations without the tedious chores normally associated with this task. Instead, to customize the BIOS, a new CBIOS.SPR file is created from the supplied modules, or user-written ones. Batch processing files (".SUB" files) have been provided for easy generation of the custom CBIOS and CP/M loader. Another advantage of this technique is that there are no limitations on the size of the BIOS program, as it is stored in a file and not fixed into the CP/M operating system. Thoughtful design like this places the Systems Group cards and operating system a cut above many others in the marketplace.

Also useful are the inclusion of additional error recovery routines when running either of the operating systems. Instead of just seeing "BDOS ERROR ON X: R/O", it is helpful to be told if it is a read or write error, the device or drive, the disk side, the track and sector of the error, and an error code that provides even more specific information.

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In addition, three options are offered by the Systems Group's implementation of CP/M (MP/M) for error recovery. The normal CP/M option of RTN to try again in the case of soft errors, or CTRL to warm boot are supported plus an additional command CTRL I. When the latter option is used, the operating system will ignore a bad sector and continue writing, while this may leave bad information in the damaged sector, it may be perferable to not being able to store any information on the disk at all —which is the normal CP/M condition. A further feature of this CP/M (MP/M) is the ability to cold or warm boot off any disk drive, including a hard disk. If the operating system is not present on drive A, the system will automatically scan all four floppy drives, followed by the hard disk in an attempt to locate the tracks.

The memory board is perhaps the more mundane of the three card set—a 64K-byte dynamic memory using thirty-two 4116, 16K by 1-bit chips. Though designed over two years ago, the DMB6400 does its job, and does it quite well. I have not noticed a single soft-bit failure as yet. While I am not a raving fan of dynamic memories, boards as reliable as this could eventually make a believer out of me.

The DMB6400 is designed for use with 4 MHz or slower CPU's (4 MHz Z80's, 3 MHz 8085's, 2 MHz 8080's, and Alpha Micros), and by virtue of the RC filter terminations on the address and timing lines can operate reliably even with long unterminated busses. This is particularly important, because the S-100 bus characteristically exhibits voltage spikes and ringing. The filtering is performed by the now almost standard use of series 200 ohm resistors and 47 pf bypass capacitors, and is both compatible with systems using terminated bus lines as well as unterminated S-100 Bus designs. To increase the noise immunity of the DMB6400, Schmitt trigger devices with hysterisis are used on some critical lines. The board slightly violates the proposed IEEE 696 standard, placing two input loads on address lines A0 through A7 as well as the PWR* control line. It is doubtful that this slight deviation will ever be a problem, as the board sources current for a high level signal only 10 ua greater than the allowable amount. Typical values for this current are well within the proposed specification, and the loading for the low-level signal state also is in compliance. Probably more critical is the timing design of any board proposed for the S-100 bus, and there are sufficient user options available to allow the DMB6400 to be compatible with a wide range of other systems—including the proposed IEEE specification.

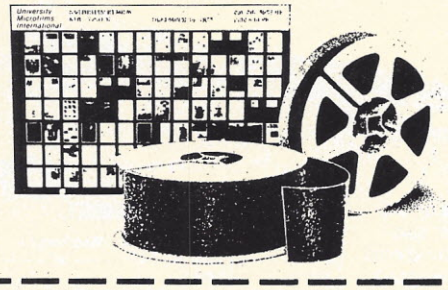
. . .each bank may reside at the same address, or all four may have different addresses . . .

As the rest of the Systems Group boards were designed to be compatible with a multi-tasking, multi-user environment, the DMB6400 was designed to augment these operations thru bank select features. The card allows four independent 16K-byte bank selectable sections with each bank having DIP switch selectable starting addresses of 0000H, 4000H, 8000H or C000H. With this technique, each bank may reside at the same address, or all four may have different addresses, and any configuration between these two extremes is possible. The bank selection technique is equally flexible, allowing logic configuration which makes the board compatible with either the Cromemco/Alpha Micro, or the North Star methods. A Cromix adapter is available which plugs into the sockets normally occupied by the bank selection configuration headers to allow compatibility with this system. To aid in troubleshooting the board during initial configuration, four LED's are provided to indicate whenever a selectable bank is "ON."

One of the more enlightening tasks facing the memory user is configuring—and adapting—the board for the particular standard implementation of the S-100 bus his system may use. The company has minimized this problem by providing application notes covering many systems. There is even an Application Note covering operation with the newer CPU boards that meet the proposed IEEE 696.1/D2 Standard. It is not necessary to implement these wiring changes when used with the CPC-2810 Z80 Processor Board, as this card can be jumper-selected to generate a PDBIN signal which is compatible with the normal (non-IEEE 696) configuration of the DMB6400.

The CPC-2810 board retails for $495, the Floppy Disk Controller (the FDC-2800) for $545, while the DMB6400, the 64K dynamic memory, sells for $695. With this three-board set, you may design and configure almost any S-100 bus microprocessor of your choice, and be assured the system will operate compatibly and reliably.□

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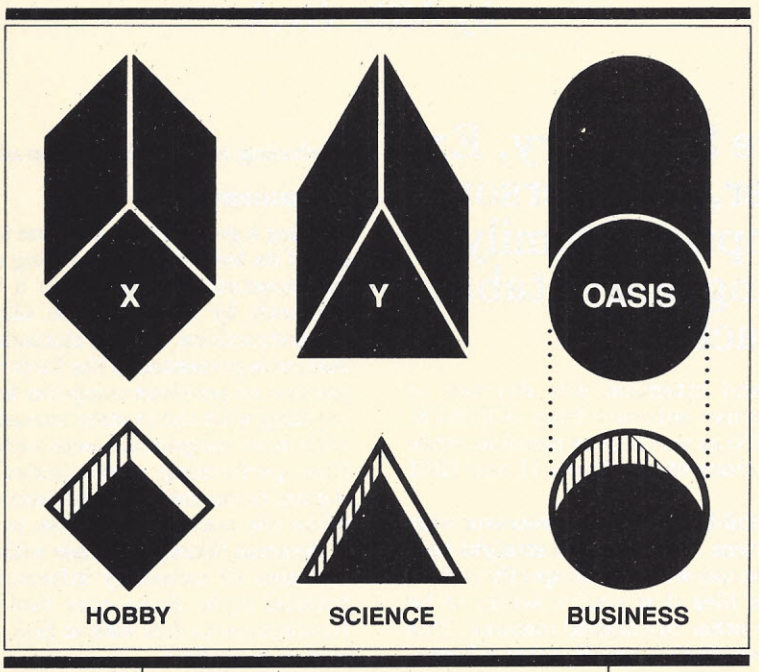
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CIRCLE NO. 65 ON INQUIRY CARD

The Executive Series

by Mike Heck

The Executive Secretary, Executive Speller, and Personal Secretary comprise a family of word processing and database application packages.

Particular thought and attention was devoted to making this inexpensive software from SOF/SYS, Inc. (Minneapolis, MN) as versatile as possible, while working around the limitations of the Apple II and IBM PC hardware systems.

Executive Secretary is a full-featured word processor with an integrated database system. In addition to straight text processing, another common use would be to specify certain information from the data files that you've set-up to be inserted into form letters or other customized material. This is done with powerful commands that specify what information is used under certain conditions.

For example, you could write a letter with five custom paragraphs, each geared toward a specific profession. Then, in printing a letter, when the program encountered a record marked "doctor," the doctor paragraph would be automatically inserted. Likewise, when other criteria were met, those special sections that you marked would be called in, and all other irrelevant parts of text overlooked.

Besides handling information from its own data files, Executive Secretary is designed to work with files from five popular database systems: The Data Factory, CCA DMS, On-Line Data Base, Information Master, and DB Master Utility Pack.

Personal Secretary is a scaled down version of Executive Secretary, providing both word processing and information handling functions. It is upward compatible with the larger version (files and text can be used by Executive Secretary).

Executive Speller is an automatic spelling aid containing a 10,000 word dictionary; this can be customized for your own special needs—to a total of 25,000 words. Executive Speller works with both Personal and Executive Secretary text files.

Hardware Requirements

The Apple II versions of both Executive and Personal Secretary—the ones evaluated for this review—work with 80-column video cards or in the normal Apple 40-column mode. In this case, an upper/lower case display chip, included with both programs, replaces the standard character display chip in the Apple (this only handled upper case characters). A single wire shift-key modification, also included, allows you to use the shift key as it was intended—to shift between upper and lower case characters.

The upper/lower case chip, normally a $50 accessory, adds a lot of value to the packages, saving you the expense of purchasing an upper/lower case adapter or an 80-column card.

Documentation

Having a good program is one thing, but getting the most out of its features is something else. Executive Secretary's documentation—typeset, in a flip-over binder—sits conveniently by the computer, allowing you to easily follow the instructions without cluttering up the workspace. Information is presented in the form of clear, simple lessons that assume no previous computer knowledge, but that get you working with the system immediately. Later sections deal with more complex subjects such as merging data from card files, performing sophisticated formatting, and editing. Again, these topics are presented with complete examples while the text explains how to go about the operation.

Personal Secretary comes with a scaled down booklet that contains all necessary information and follows the same tutorial style. Some may find the smaller size and type troublesome to deal with at first, but everything is organized and easy to find.

Operation

All programs within the series work with a combination of menu selections and keyboard control sequences. Text formatting is handled by simple codes imbedded within the text. For example, selections from the main menu allow you to create or edit documents, print, create or edit a card file, perform utility functions, reconfigure the system for different printers, etc. or just "dash off a quick note" without going through the editing procedures.

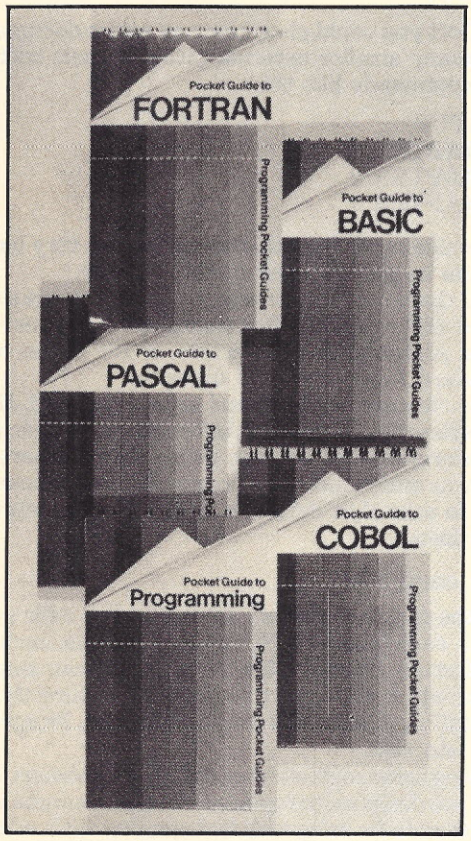
Once in the editor, you can enter the "typewriter" mode and immediately start typing away as you normally would with the margins and other formatting criteria set to their default values. The screen is very clean, except for a status line at the top; the remaining display is reserved for text. If you make a mistake while typing, the back-arrow key will delete the previous character. All other changes are made in the edit mode.

There is no word wrap-around. Words are not broken at the end of a line, rather the full word is brought down to the next line. However, these programs are reformatting word processors. What is displayed on the screen is not necessarily the way it will look in print. This is because the actual screen size doesn't match the paper width in some cases, and formatting commands don't take effect until print time.

For editing purposes a draft print option reproduces text exactly as the screen shows it, along with line numbers. This way you have an easy reference point when you need to make changes. In addition, the latest release of Executive Secretary, version IV, contains a way to have some formatting commands operate immediately, making the screen display conform to the printed material. The penality is not being able to easily edit material later, due to extra spaces placed in the text that handle the on-screen formatting.

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Editing

For most people, editing involves changing, adding, moving, and deleting everything from single characters to entire blocks of text—all the while being able to move around freely within a document.

Executive and Personal Secretary contain powerful and easy-to-use editing commands. Cursor movement is defined by the left and right arrow keys, plus the RETURN key to move up and the slash (/) to move down. On the Apple keyboard this forms a logical diamond pattern that's easy to remember.

Adding text is simply a matter of positioning the cursor where the new text is to start, typing "A" for add, and the new text entered will be inserted as existing text is moved down. For removing unwanted material you have the option of deleting characters, words, lines or entire blocks. This is accomplished with single character commands or sequences; "D" for character deletion, SHIFT-D for word deletion, CONTROL-D for deleting a line.

A "mark block" command allows you to define a section of text that can then be deleted, moved or saved. The block save command is particularly useful as you can then recall those sections of text and place them anywhere within the current document or other documents.

. . .you can move through a document page-by-page, screen-by-screen, or go directly to a specific line number. . .

Other useful editing commands move you through a document page-by-page, or screen-by-screen, allow you to go directly to a particular line number, and perform global search and replace.

Formatting

You instruct the programs to perform specialized formatting through a series of two-letter codes that are embedded within the text. For Executive Secretary, these commands cover just about every option: page length, margins, indention, numbering, headers, tabs, justification, etc.

An example might be:

```
>pl 66:>tm 6:>bm 6:>lm 12:>wd 84
```

This would set the page length at 66 lines, the top and bottom margins at six lines, the left margin at 12 spaces and the line width at 84 characters. Additional commands can be specified at any point within the actual text and they take effect or cancel previous commands when encountered.

An interesting use of commands is to create a document from pieces of text that were saved earlier. This is done with the SF, sub-file, and XT, external text, commands. Basically, SF allows you to insert a section of text, that was part of the current document, at any point without retyping it. This would be great for creating legal documents or other form material. It might be handled like this:

```
This is a section of a main document where we need
to insert a standard section called SETUP. That
piece would be automatically inserted at print time
with the sub-file command that follows.
>SF SETUP
```

With little effort you could also create an entire document made up of many smaller external pieces of text with a sequence of commands like this:

```
>XT SETUP
>XT CHAPTER 1
>XT CHAPTER 2
>XT CHAPTER 3
```

You might be able to see from this sequence that very large documents can be put together in this manner.

About 3000 characters can be held in memory at one time on a standard 48K system. After that point text must be saved to disk. About 25,000 characters, or 100 pages, will fit on a standard Apple DOS 3.3 diskette.

Another nice feature is a keyboard input command, KD. This prompts the operator to enter information, a name perhaps. This information could then be placed anywhere in the document, as many times as necessary. Other commands can be used to take that data and format it precisely on a preprinted form.

Electronic card file

This part of the program allows you to establish a file with up to 13 lines, each labeled with a different name, such as name or profession. Once the file is set up you can search for particular information, sort it, print it out directly as a report or mailing labels, and most important, integrate information into text.

While missing some sophisticated database functions, the card file was not designed to replace existing programs and is certainly adequate for using with text merging applications. And remember, Executive Secretary interfaces with other database programs. To give you a feel for how data is used within text, try to follow this short example:

```
>MN CUSTOMER
>RN
>&01
>&02
>&03

Dear &01,

Being a &04 certainly means that your time is more
valuable than most people. And we would like to
show you how to make it more productive.

>IF 4 secretary
There is certainly more to your job than just typing
and filing.
```

Here we've instructed the program to get the customer file, starting with the first record, and insert the first three fields (name and address) in the proper spots. The fourth field in the Electronic Card record is the profession of the person and it is inserted in the text in place of '&04".

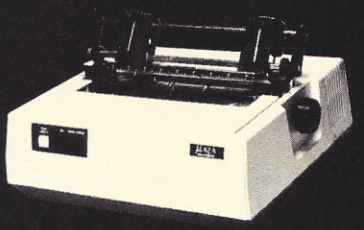
The IF command performs some logic and would insert the secretary paragraph only if the profession was secretary. The

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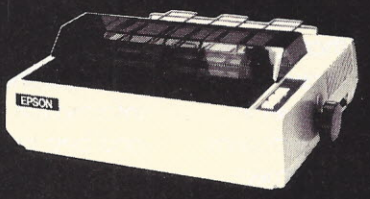
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CIRCLE NO. 61 ON INQUIRY CARD

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Ever since Radio Shack sold the first TRS-80 Model I users have been searching for detailed information about its inner workings that Tandy would not, or could not, make available. In particular the Level II BASIC from Microsoft contains dozens of subroutines that can be tremendously useful to any programmer, but Tandy Corporation is probably under contractual obligation to Microsoft not to supply information (if they even have it!).

Dedicated users, proficient in assembly language, have disassembled the Level II ROMs and made their own comments. But the majority of users are left in with virtually no information, apart from occasional articles and whatever they can decipher on their own.

ENTERPRISING USERS - Several of the more enterprising programmers realized that if they published their own comments a lot of TRS-80 users would buy them. The BOOK, Disassembled Handbook and Supermap are some of the available books giving comments on the ROM set - but they all suffer from serious drawbacks, being either incomplete, unintelligible or even worse - inaccurate!

Incomplete books are usually published when the author has not finished understanding what he's writing about. Hence the "continued next book" lines in some publications, translated into english read "buy another book when I've done some more work". Unintelligible books are due to poor editing, or no editing at all! Inaccurate information is a result of not checking with anyone else.

Microsoft BASIC Decoded & Other Mysteries is both complete and understandable. Nearly 7,000 lines of comments for the Level II ROMs, with an additional 6 chapters of useful information, make this the biggest and best book available on the subject.

Written by James Farvour, the comment section took more than a year to finish - it even includes the changes for the latest ROM set in an appendix. Edited by Jim Perry, until recently managing editor of 80 Microcomputing, the text and comments are understandable.



Complete & Understandable - IJG, publishers of TRS-80 Disk & Other Mysteries, could have published an incomplete or unintelligible book on the ROMs - but chose to wait and do it properly.

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CIRCLE NO. 101 ON INQUIRY CARD

text could have continued with additional text for other professions. Valid logical commands include OR, AN, GO, plus operators ">", "<", and "=". All this combines to give you complete control over what information is printed, and where it is placed in existing text.

A few other general commands worth mentioning are abbreviations, automatic numbering special printer commands, and indexing. A phrase can be associated with a two-character code, and whenever that code is encountered, the entire phrase will be inserted. Automatic numbering makes use of a number of counters that can be updated and whose value can be inserted in the text. This is valuable where you have numbered sections that are relative to each other.

Normally, if one section was deleted at the beginning of the document all the following sections would be numbered wrong. Using the registers, each section could be prefaced with a command like ">#a1 + 1" which would increment the counter a1 by one at the start of each new section. The register value would then be inserted in the text in the proper place. You can even use counters to remember page numbers for later reference. This is important because exact page numbers are seldom known when you are composing a document.

Provisions are made to define two-character codes as their ASCII value to execute special printer functions such as half line-feeds, or accessing special print wheel characters.

If you work with large documents creating an index can be a major headache. The index function lets you set up index entries with page numbers. The indexer then sorts entries alphabetically and formats the index properly.

An electronic mail feature transmits files to and from other Apple or mainframe systems, even if they are not equipped with Executive Secretary. Text can then be printed or modified at the remote location.

Spelling aid

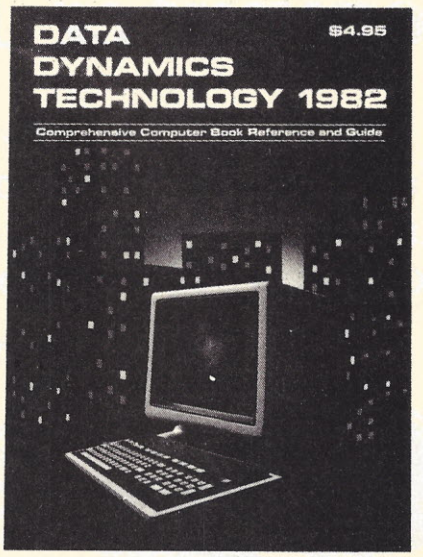
The Executive Speller applications compares words in your text files with its dictionary. You have the option to proofread only—where any words unfound in the spelling list will be marked—or proofread and correct—where you have the option of correcting or skipping over each unfound word. New words can be added to the dictionary at this time or held for later evaluation.

An option is also included to start your own spelling list. This might be used for special applications such as medical or scientific work. The spelling process proceeds fairly effortlessly, but it does require some human intervention.

In general, all these systems performed above par, and offer excellent value, especially when their features and hardware add-ons are considered. And some features can't even be found in systems costing many times more.

There were a couple of operating considerations that could stand some improvement, such as operator prompts and error checking. For example, when you format a data disk, the screen says to insert a disk, but doesn't mention which drive it goes in. The documentation does say which one, but the procedure might be confusing to a novice. Another point is that the program sometimes "hung" if a wrong data disk was inserted. A suggestion would be to have the program alert the operator to the condition and allow processing to continue. Even with these small problems, operation of these programs is smooth and error-free, providing an environment to get a lot of work done. □

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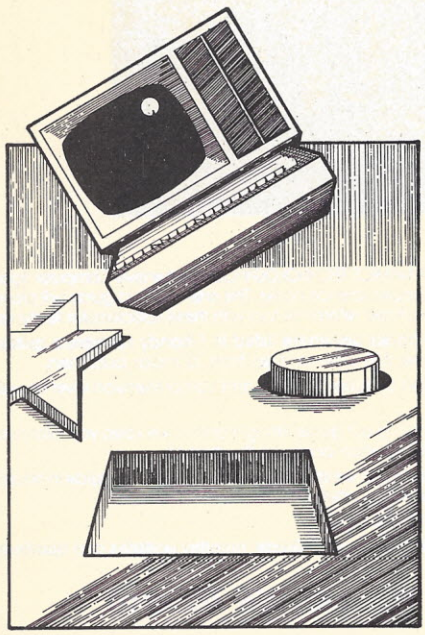
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by Reginald D. Gates.

Confound the skeptics and minimize your headaches by following a structured approach to an office computer conversion.



The old adage that heralds the importance of first impressions is especially true when it concerns the initial stages of a business computer installation. Not only is there considerable speculation on the alleged capabilities of the machine, but other people are watching closely and judging the merits of the new venture. Challenge the cynicism of computer-shy co-workers by following a few time-proven principles of successful office automation.

Choose the right function

The function delegated to the computer should be deemed the most likely to succeed—from the point-of-view of the computer. A computer is very quick at manipulating data, works inexpensively and is relatively tireless. However, compared to a clerk, the machine has almost no powers of discrimination. The more discernment involved in a task, the more difficult it is to make any computer do that task well.

Suppose we are considering implementing either a mailing list or a sales forecasting function. We can train a high school graduate to manually update a mailing list in a day, but how long would it take him to learn to produce accurate sales forecasts? Three weeks? Three months? The longer the period of time it takes to train someone to do the forecasts, the more difficulty we will have in implementing sales forecasting on the computer. The longer training period indicates that a significant degree of judgment is needed to properly carry out the function.

If the function being considered must produce data for someone outside your business, it probably should not be the first function implemented. If a mistake occurs, it's simply better to keep everything internal. Imagine sitting at the IRS agent's desk holding a floppy disk and saying, "Well, all my records are here, but there's a little error in the program so I can't print them out for you." This suggests that applications like inventory control are a better choice for a first implementation than tax records or payroll.

A computer never solves a business problem—computerized chaos is still chaos. The computer will provide enough timely, thorough information to support a sharp executive in making the right decisions for the business. The computer is the tool that does the work, but the manager makes the choices.

Suppose a business has a cash-flow problem. If we implement the accounting functions on the computer, we have not eliminated the problem, only spent funds to automate it. However, we have gained rapid, objective visibility into the problem. We can now determine who the slow-paying accounts are, and what sales region they're located in. We can also simulate the effects of possible courses of actions (What if we dropped all discounts to 90 days behind?) The manager can now evaluate the information provided by the machine and choose a course of action.

The best way to achieve the conversion to computers is through a step-by-step process. One approach is to follow four phases: announcement, training, parallel testing and switch-over. The first step is to simply inform your staff that you are bringing in a personal computer to do a specific function (e.g., maintain the client mailing list). If you have chosen the right application, the staff will welcome the thought of having a computer to do "all that routine work." In addition, you will find that a lot of people want to learn about computers and will volunteer to be trained on them.

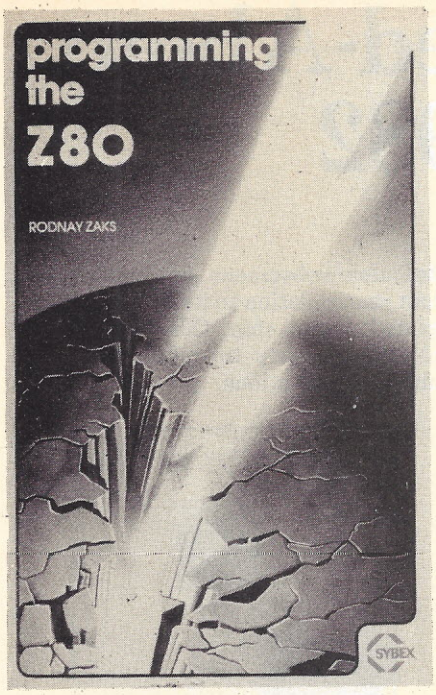
Next, you must provide the training for using the computer. It doesn't have to be elaborate, but its presence tells the people that you are serious enough to invest resources in this project and that you intend for them to find it easy to use the computer. In addition, the training may uncover problems you never considered when evaluating the application.

A good way to assure that the new methodology will work is to run parallel for a period of time. This means that you duplicate the work, first manually—then on the computer. The duplicate work represents an investment in the success

Continued on page 185

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The Ten Most Talked-About Products of 1982

by *IA* Staff

Year-end "ten-best" and "ten-worst" lists are as traditional as Auld Lang Syne. But they are seldom lacking in controversy—one man's sirloin dinner is another man's bologna sandwich. For this reason, we thought we would try something a little different in our "ten-product" compendium for 1982.

The ten products listed below are significant not so much for the products themselves—as for the trends that they represent. From our perspective—attending trade shows, shuffling through miles of press releases, talking to hundreds of company spokespeople, end users and *IA* readers—these products offer a good cross section of what was on people's minds in the business computer world of 1982.

What *was* on consumer's minds? One very big topic was user-friendliness. On-screen tutorials and easy-to-run programs seem to be the current vogue among application packages. The era of the computer hobbyist emphasized *do-it-yourself.* The era of the office computerist emphasizes *do-it for-me.* From heavily menu-oriented offerings (such as Select Information System's word processing program) to automatic program generation software (D.J. 'AJ' Systems), the accent in 1982 was on products that were quick to get up-and-running—and easy to operate. The Savvy personal language system (included in our "ten" list), epitomizes this trend—it even responds to poor grammar and sloppy sentence structure. (It might someday replace magazine editors.)

Another notable bandwagon effect during 1982 was the rush of products intended to capitalize on Adam Osborne's brainchild—the Osborne I portable computer. After Osborne proved that there was a market for desktop computer capability in a more compact package—at an affordable price—the era of briefcase computing was launched. We selected Osborne's product as a "ten" not only because it was the granddaddy of the portable market—but also because it held its own during 1982's onslaught of competitors, continuing to generate media attention and hefty sales.

Word processing programs were omnipresent. Everywhere we looked during the past year, someone was introducing a new word processor, or enhancing an existing offering, or presenting grammar-checking, proofreading and indexing options. Though many new offerings (such as Perfect Writer from Perfect Software) introduced some impressive features, we settled upon the venerable WordStar for our "ten" list, due to its unflinching popularity and continuing fame.

What were some of the other widespread trends of 1982? Local area networking capabilities and multi-user environments, 16-bit systems, and ergonomically-designed hardware were all important factors in 1982 product design. All are represented by one or more of the products on our list.

Before segueing to the "envelope please" ceremony, it should be pointed out that our list is not intended to spotlight the ten "best" products. Dozens of other worthwhile examples would offer stiff competition to any product on this list. But few should argue with the fact that the products included here were very much in evidence during 1982. And many will gain even more prominence in the months to come. It should also be made clear that the press deadline for this issue is prior to the Nov./Dec. Las Vegas Comdex show. Perhaps significant Comdex announcements will turn up among the most "talked-about" products of 1983.

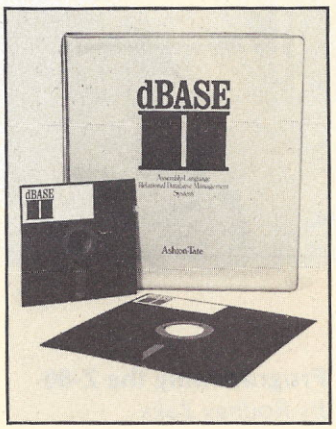
One final note: Some pioneer personal computer manufacturers have been omitted from this list. While still sharing highly significant market shares, it was felt that these offerings were not as much in the limelight during the year as were some more recent releases. Many would clearly place high on a "runner-up" listing.



Corvus Concept

(Corvus Systems, San Jose, CA)

Conceived as an extension of the Omninet local area network, this innovative workstation incorporates a wide range of advanced features. From its variable position display, user-definable subscreens, and multi-type font manipulation to its MC6800 integrated circuit chip, this $5,000 unit challenges users to define new and unique applications.



dBASE II

(Ashton-Tate, Culver City, CA)

Credited with bringing mainframe-like features to the microcomputer, this relational database management system features an applications development package that uses a structured English-like language. It handles multiple databases on one drive. The $400 floppy disk version has helped scores of microcomputerists attain more rapid and efficient programming capabilities.



DEC Personal Computer Series

(Digital Equipment Corporation, Maynard, MA)

These long-awaited 16-bit offerings from the company that claims to be the world's leading manufacturer of interactive computers disappointed few. Versatile three-module component-structuring includes a unique multi-

positional monitor and low-profile ergonomic keyboard. Basic hardware ranges from $3,500 to $5,000.



Epson QX-10

(Epson, Torrance, CA)

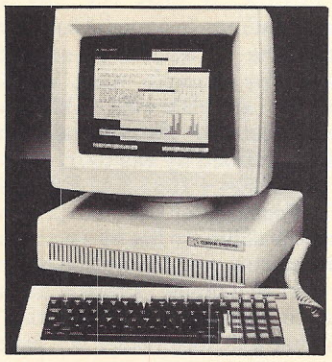
Designed for the user with a minimum of computer aptitude, this full-featured tool is destined to be one of the first microcomputers that the average consumer will actually feel comfortable with. Primary emphasis has been placed on the human interface through a special keyboard and transparent software. It's available for about $3,000.



Grid Compass Computer

(Grid Systems, Mountain View, CA)

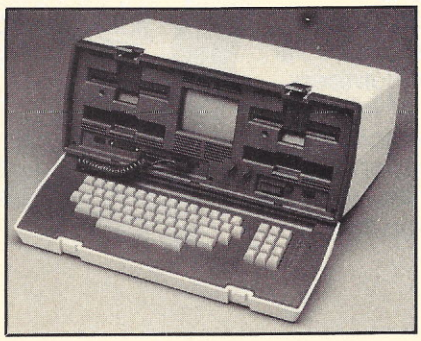
This 9.25-lb package combines more state-of-the-art technologies than perhaps any other on the market—regardless of size. The 16-bit machine features 256K bytes of RAM and 256K of non-volatile bubble memory housed in a magnesium case. The screen is a bit-mapped flat-panel unit that displays amber images. Fully integrated software and a complete set of advanced peripherals round out the package. Its $10,000 price tag is aimed at Fortune 1000 executives.



IBM Personal Computer

(International Business Machines, Boca Raton, FL)

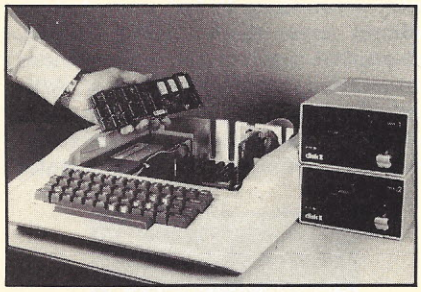
This well-publicized entry from the industry giant is now celebrating its first anniversary since introduction. Third-party vendor support has been built from scratch and now rivals that of the more popular systems adorned with several seasons of market presence. Undergoing cautious enhancements, the PC will continue to play a significant role in the marketplace as a shakeout of manufacturers occurs. Basic systems are available for about $4,000.



Osborne I

(Osborne, Hayward, CA)

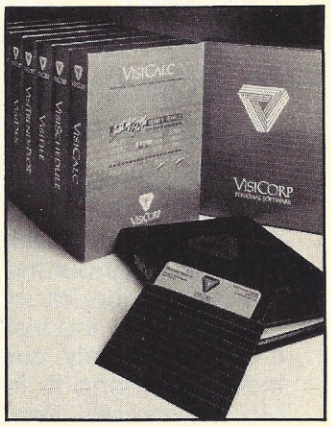
The compact size of this product initiated a new trend in the industry—portability. The inclusion of a complete set of software for a low initial cost make this system attractive for low-end business applications. Despite some hardware limitations—such as a very small video display screen—and limited disk storage, the price of only $1,795 defies criticism.



Savvy Personal Language System

(Savvy Marketing International, San Mateo, CA)

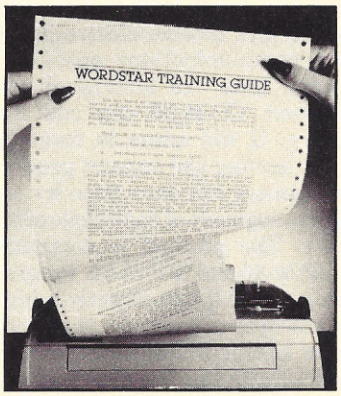
Part hardware, part software, this product is said to provide an enhanced level of machine-oriented intuition. To some extent, it can recognize conversational words and interpret misspelled commands. It is based on the principles of what is called a pattern recognition processor. For example, an accounts payable program could be adapted to respond to a statement such as "Give me all my invoices for December," or it will recognize "I need the December shipments." Listed at $950, it has yet to hit full stride in the market, but has generated considerable press—especially because it is one of the first steps toward bringing artificial intellegence to microprocessor-based operaticns.



VisiCalc

(VisiCorp, San Jose, CA)

Is there still anyone out there who needs an introduction to this best-selling problem-solving electronic worksheet? More than 300,000 people have applied this program for assistance in planning, budgeting and forecasting. Acclaimed and widely emulated by other software writers for its "what if?" capabilities, it can manipulate virtually anything numerical. An industry-wide adage cites this single piece of software as responsible for selling about 250,000 Apples. Now that it's available for other operating environments at about $200 a pop, observers have lost count.



WordStar

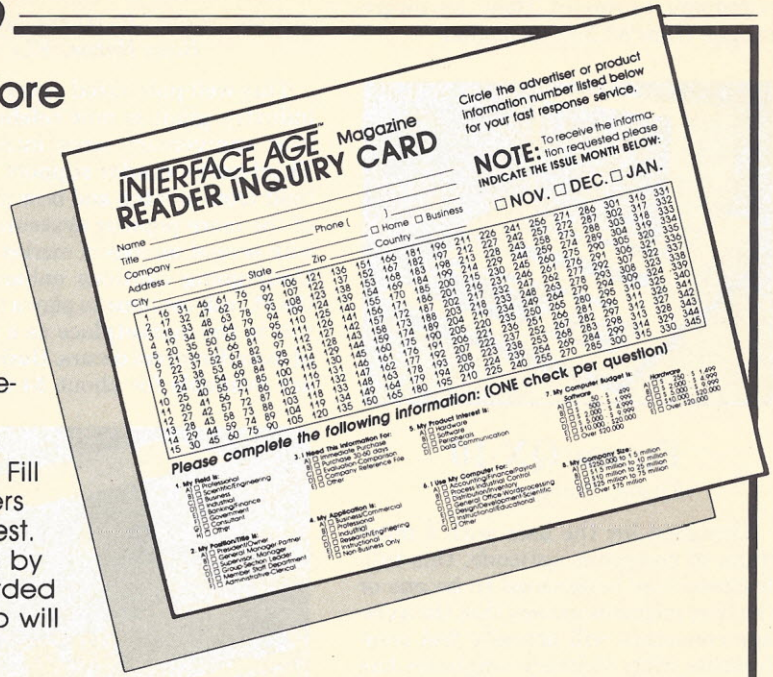
(MicroPro International, San Rafael, CA)

This is not exactly the "friendliest" word processing program available—but perhaps the most mature. This powerful package can accommodate a wide variety of operating environments and has undergone several generations of development. It is the best-selling text manipulation package. Broad documentation and flexible capabilities have made this the *de facto* standard to which others are compared. At $500, it is at the high end of the consumer spectrum.

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BUSINESS SOFTWARE

Multiple job integration

Concurrent CP/M-86, for 8086- or 8088-based microcomputers, allows a single-user to perform several jobs simultaneously. A user can, for example, print a file, enter information into a database and receive electronic mail from a communications port—all at the same time. An individual using Concurrent CP/M-86 can call up a directory, if file name is forgotten, without leaving the current program. Programmers can save time by compiling one segment of code while editing another. The product is compatible with CP/M-86 and MP/M-86. Programs running under it can directly address up to 1M-byte of memory. It supports up to 16 logical drives, each containing up to 512M bytes, for a maximum of four gigabytes of on-line storage. Other features include: a real-time kernel; record and file locking; date and time stamps; password protection on files; error-handling and reporting; network compatibility and multiprogramming capability. The first implementation of Concurrent CP/M-86 will be on the IBM Displaywriter, with versions for other microcomputers to follow.

Digital Research, Pacific Grove, CA.

CIRCLE NO. 150 ON INQUIRY CARD

Tax planner for IBM PC

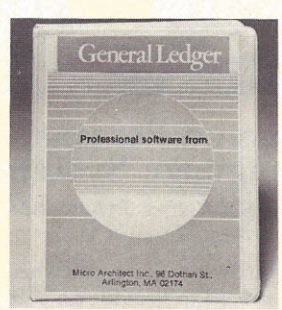
Plan 1040, is a "what-if" income tax planner that can run virtually any number of tax strategies and deliver the results in seconds. It covers tax years 1982, 1983; including the 1982 Tax Equity and Fiscal Responsibility Act.

Software 1040, New Hyde Park, NY.

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General ledger for IBM PC

GL is the heart of an integrated accounting package. Features include double entry accounting, ISAM, and a full 80-column screen display. It is flexible, interactive, menu-driven, and provides automatic integration with A/P, A/R, and Payroll. Output includes trial balance, balance sheet, income statement and department income statements. It requires IBM DOS, a 132-column printer, a dual disk system, and 64K bytes of memory. The major programs are: Master File Maintenance/List, Transactions Enter/Register/List, Account Status/List, Generate Financial Reports, Accounting Transactions Transfer, End-of-Period Processor, and System Initialization.



Micro Architect Inc., Arlington, MA.

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Accounting system

Fixed Assets Accounting System can produce depreciation and supporting schedules for one or more companies. For the user requiring separate depreciation methods for tax and accounting purposes, the program offers separate schedules for up to three sets of books. The system also incorporates the recently-enacted economic recovery laws, providing verification of asset file additions and appropriate reports by current and prior tax laws. In addition to depreciation statistics, investment reports pinpoint potential tax credits as well as disposition gains or losses.

Peachtree Software, Atlanta, GA.

CIRCLE NO. 153 ON INQUIRY CARD

VisiCalc utility

VC-Documenter gives the user greater flexibility when documenting his VisiCalc models. It uses the row and column headings in a model to print in English the definition of each cell address. For example, what VisiCalc would list as >B3:+B1−B2 would instead be listed by the row and column headings defined by the user, such as 1983 GROSS=+1983 SALES−1983 COST. Features of the new program include the ability to list by row/column or column/row, and the option to print all or part of a model. There is no limitation to the size or complexity of model that VC-Documenter will handle,



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CIRCLE NO. 17 ON INQUIRY CARD

and the program runs independently of VisiCalc. Currently it can be used on an Apple II or II Plus (DOS 3.3) with 48K and disk drive.

Desktop Solutions, Houston, TX.

CIRCLE NO. 154 ON INQUIRY CARD

Security for CP/M

Secure is designed to stop unauthorized use or access to CP/M files. It is based on a proprietary encryption technique. Files may be repeatedly processed for even greater levels of security. It uses two user-supplied keys to safeguard files; its file handling is limited only by available disk storage space. Version 3.0 is available on a variety of disk formats for any Z80 microcomputer using CP/M 2.0 or later.

Century Systems, Garden Grove, CA.

CIRCLE NO. 155 ON INQUIRY CARD

Chart-making capability

Series PGL Business Graphics System allows easy definition of bar graphs, line graphs, pie charts and word charts.

Peachtree Software, Atlanta, GA.

CIRCLE NO. 156 ON INQUIRY CARD

Mailing list for IBM PC

Mail-Track-I stores 1,100 labels on a single-sided floppy disk and 2,200 on a double-sided disk. The list remains in ZIP code order as you enter the information, warns duplicate entries, can be searched with any of the seven fields, handle foreign addresses, have several files on the same floppy disk, print 1,2,3,4 across and uses 3 1/2×15/16 size labels. It requires 64K bytes, display, 1 drive, PC-DOS, and printer.

Sapana Micro Software, Pittsburg, KS.

CIRCLE NO. 157 ON INQUIRY CARD

North Star mailing management

Supermailer, Version 3.7, is a database management system for assembling and printing large mailing lists and labels. File sorting is possible by name, zip code, and any other user-defined parameter. It can strip off sub-lists from the master list and may be configured to one of several disk capacities. It requires a North Star system with 48K bytes and runs under Basic. A CP/M version is also available.

Single Source Solution, Concord, CA.

CIRCLE NO. 158 ON INQUIRY CARD

Multi-user OS for IBM PC

Qunix Operating System gives multi-user capability to the IBM PC. The new system contains as a standard feature ED, a fast, full-screen text editor that can be run in either monochrome or in color. It also contains DOC, a powerful text formatter. Additional features include a hierarchical file structure that allows the user to file programmed material by topic; a 16-character capability for file and directory names (most operating systems contain only 8-character capability); built-in security that protects information that is contained on programmed disks; the ability to communicate with any other personal or mainframe computer by telephone or cable; and powerful, easy-to-use commands for printing, sorting, comparing and backing up files. It is compatible with a variety of devices, disk drives, modems and printers, and has the ability to read disks written under the PC-DOS operating system. Five Qunix systems are available that are tailored to the precise needs of the user. Two of the systems are designed for general use and include program development tools together with the text formatter system. The three other Qunix systems are designed primarily for business use in which application software will be purchased separately.

PC/Software, San Francisco, CA.

CIRCLE NO. 159 ON INQUIRY CARD

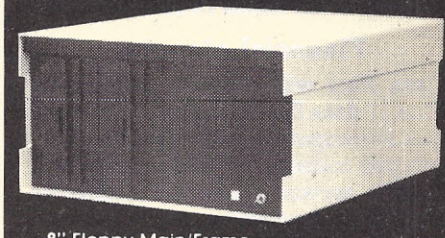
Word processor for CP/M

Metatype includes true proportional spacing (support for PS print fonts) with an appearance almost like typesetting and easily programmed character widths; margin justification either by adding extra space between words only, uniformly throughout the line, or uniformly whenever spaces between words exceed a programmed maximum size; and programmable boldface by number of overstrikes and carriage offset. Correct line breaks are shown on the screen even for PS fonts, as are page breaks including full headings and footings. Deletion recovery is provided. Other safeguards against user problems are provided by unique "freeze" and "thaw" operations that isolate on only the text being heavily edited, preventing the rest from being accidentally changed; "show" and "verify" options during global search and replace, which allow the user to interrupt an incorrect global search and replace before serious damage is done to the text; and a special shadow buffer in the screen mode, which keeps a copy of the original version of the line with the cursor and can be swapped with the current version by a single control code. The user interface uses only a single level of con-

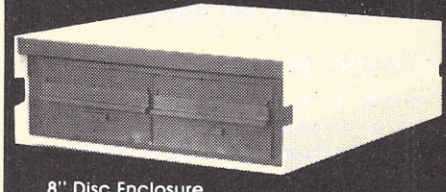
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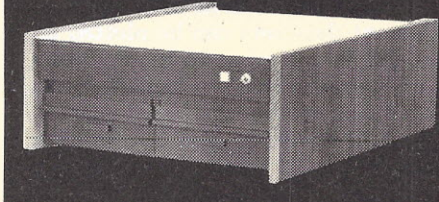
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trol codes for screen commands, with menu-driven two-letter commands for global operations. Full user-transparent automatic bidirectional disk buffering is provided for large files. It supports standard typing habits by allowing carriage returns in the middle of paragraphs.

Westico, Norwalk, CT.

CIRCLE NO. 160 ON INQUIRY CARD

Financial planning

Data Plus will convert Accounting Plus] [data files into the DIF format that is compatible with VisiCalc. This lets you manipulate and plot general ledger, accounts payable, accounts receivable, and inventory data using the products from VisiCorp.

Software Dimensions, Citrus Heights, CA.

CIRCLE NO. 161 ON INQUIRY CARD

Statistics program for IBM PC

Pairstat is a powerful collection of tools to evaluate and present paired data. It includes data entry, computation, and editing features; scatter or smooth line plotting; curve fitting; and calculations from the curves. Up to 1,000 data pairs can be used; up to 11 different data sets can be plotted on one graph; and up to 20th order polynomial regressions can be performed. Statistical results include R square, standard deviation, plot of residuals, beta, standard error of coefficients, and mean. The user can define functions to manipulate data. Curves can be integrated, differentiated, and interpolated. Maximums and minimums can be found for the curves. Seven different reports may be generated on the printer. It requires the IBM PC, one or two diskette drives, 64K bytes of user memory, 80-column display and printer.

Davell Custom Software, Cleveland, TN.

CIRCLE NO. 162 ON INQUIRY CARD

Master specification system

Compuspec is for use by engineers and architects in preparing project specifications. The system utilizes the CSI Format and currently contains over 150 sections. Most sections are usable in their present form, while others must be customized to each individual project. Special codes, together with a global replace feature, allows owner and project names, titles, bid opening dates, and other specific project-related information to be automatically inserted throughout the specifications in a matter of minutes. It is available for use on Radio Shack Model II and Model 16 business microcomputers with a Daisywheel II printer.

Eberhard Engineering, Smithtown, NY.

CIRCLE NO. 163 ON INQUIRY CARD

Medical office management

STR medical system is designed for the single or group medical practice and will operate on any Z80-based computer, using the Oasis operating system (single or multi-user, release 5.5). It maintains standard AMA (CPT) and/or user-defined service codes, descriptions, and fees for each doctor. Diagnosis, services performed, payments, and adjustments for each patient are entered on demand. It allows several different types including cash, check, bankcard and insurance. It retains up to three year's transaction details. In addition, the system supports a contract option for extended or deferred billing. A diagnostic and procedural analysis feature allows sophisticated data comparison for statistical or reporting purposes. Data extractions may also be made on the medical database and analyzed by external software through a built-in file creator.

STR Corp., Norcross, GA.

CIRCLE NO. 164 ON INQUIRY CARD

Database for market research

Micromarkets contains 35 key demographic and retail sales variables for each state and for each of the 38 largest metropolitan areas. It is available for the Apple II and II+ (DOS 3.3), TRS-80 Models II and III, and the IBM PC. It requires 48K memory and one disk drive.

Orrington Economics, Arlington, VA.

CIRCLE NO. 165 ON INQUIRY CARD

Financial management models

Pro/Pac series of 11 VisiCalc financial templates will assist the manager of service firms in such fields as engineering, advertising, architecture, consulting (or any firm selling time as a source of revenue) to determine billing rates, estimate fees, forecast cash needs, budget projects, determine staff assignments, monitor billable time, invoice clients and control project time and costs. These models are set up to be easily modified and adapted to the individual firm's needs. It requires VisiCalc and one 5.25-in. disk drive. A printer is recommended. It is available now for the Apple III 128K or Apple II and II+ 48K microcomputers.

Pro/Pac, Houston, TX.

CIRCLE NO. 166 ON INQUIRY CARD

Energy use tracking tool

Energy Monitor provides a way to account for energy units, energy expenditures, and energy use relative to climatic variables. It can handle from 1 to 90 independent energy consuming buildings and produces a set of six reporting formats. Each illustrates energy use and documents energy conservation activity by fuel type at each building and for the system as a whole. A manager can use it to identify and set energy conservation goals and objectives, prepare the energy budget for next year, provide reports for committees, verify invoices for proper billing and fuel delivery, and document the performance of energy saving capital investments. It is available for the Apple II and the TRS-80 Model III.

Addison-Wesley, Reading, MA.

CIRCLE NO. 167 ON INQUIRY CARD

Real estate analysis

Execuware is available for use with Apple II, Apple II Plus and IBM Personal Computers. The package is designed to help give you the insight to make decisions about whether to acquire, hold or dispose of a piece of property. It incorporates the depreciation methods of the Accelerated Cost Recovery System of 1981; allows up to 20 year projections and uses a growth rate to simulate inflation; stores up to 15 investments per diskette; handles up to three separate loans; utilizes the Rule of 78's; handles interest only or switched loans, balloon payments and assumable loans; calculates Internal Rate of Return; highlights the tax sheltering effect of an investment; performs property income analysis; and includes capital improvements.

Microcomputer Software, Charlotte, NC.

CIRCLE NO. 168 ON INQUIRY CARD

Portfolio income program

Portaids series of utility programs for investors includes Income Records for Securities for the Apple Computer. Investors are able to maintain detailed records of dividends and interest income and support their reporting under the new tax law. The user develops a complete and detailed journal of dividends and interest items received during the year. A summary report, by security holding, is always current and immediately available for supporting tax Schedule B. The IR/S program separates non-taxable and taxable security income. A user may define codes and produce reports by convenient categories, such as types of

bonds, types of stock, broker, etc. Or the coding facility may be used for tracking withholding from dividends and interest. It operates with a 32K Apple II+, DOS 3.3 with at least one disk drive.

Portware, Edina, MN.

CIRCLE NO. 169 ON INQUIRY CARD

CP/M-based mailing list

Members is a mailing list management system that allows sorts alphabetically, by zip code and up to six other precoded variables. The number of names is only limited by available disk space. Different mailing lists can be kept with ease.

Single Source Solution, Concord, CA.

CIRCLE NO. 170 ON INQUIRY CARD

Financial forecasting for Apple

ProForma is a new powerful financial projection system for the Apple III. All financial functions are built in. The user responds to prompts from the screen. The program uses more than 700 pre-programmed conditional commands and can calculate millions of possible variations.

Management Control Concepts, Boston, MA.

CIRCLE NO. 171 ON INQUIRY CARD

Pay TV subscriptions

STS Plus handles all subscriber invoicing, receivables, and maintenance reporting. It provides a variety of reports on subscribers and helps subscription services spot slow payers and maintenance problems. It provides apartment building totals, building owner's commissions and identifies building-wide problems. Word processing capabilities include the ability to send individualized letters to subscribers.

G&Z Systems, Eastchester, NY.

CIRCLE NO. 172 ON INQUIRY CARD

Stock market program

Stockvue is a comprehensive software program for stock brokers as well as individual investors. It posts all relevant data on a single screen in spreadsheet format, allowing investors to scan the information, change variables, and consider other options. It is available on disk or cassette for the IBM PC, TRS-80 III and in a CP/M version.

Star Value Software, Austin, TX.

CIRCLE NO. 173 ON INQUIRY CARD

Stock market simulation

Millionaire provides a no-risk initiation into the world of Wall Street. Players can manipulate as many as 15 different stocks with a variety of transaction formats including buying and selling stocks, put options, call options, buying on margin, borrowing against your net worth and others. Stocks' corporate histories can be summoned, as well as week-by-week industry trends and graphs. Millionaire runs on the Apple II Plus and Apple III, IBM PC, Osborne and other CP/M systems.

Blue Chip Software, Tarzana, CA.

CIRCLE NO. 174 ON INQUIRY CARD

Enhanced database management

Informix Release 2.0 is a relational DBMS for 16-bit computers running Unix and Unix-like operating systems. A screen-oriented data entry program, Enter2, is included in the release. Users can add, delete or update records interactively on a formatted screen. Single keystrokes move the cursor forward or backward through the record and within fields. It also contains a set of find commands. Users can find the first, last, next or previous record in order by indexed fields. The find command will also search for specified values. A new access method, called C-ISAM, allows users to create and manipulate indexed files of records. Instead of searching through data record by record, users read the desired record by value. Also available in the package is the RDS Ace Report Writer. It allows reports to be created using a non-procedural, English-like language, and allows users to call C subroutines. Other improvements include a menu-driven front end for access to all interactive Informix programs, easier restructuring of existing databases, and simplified query operations.

Relational Database Systems, Sunnyvale, CA.

CIRCLE NO. 175 ON INQUIRY CARD

Forms processing for IBM PC

VersaForm Business Form Processor has been a popular package for Apple II, Apple III and Apple-compatible hard disk systems such as ProFile and Corvus Omninet. The new IBM version shares a standard user interface. Identical command structures, reporting procedures, screen display formats and file maintenance routines allow existing users to implement their form templates on an IBM without modification. As a forms processing database, it is specifically tailored to handle common business forms associated with most business operations. It utilizes a two-level, hierarchical record structure. The IBM PC version is compiled under version IV.0 of UCSD Pascal. Exchange of forms data is permitted between Apple and IBM Systems, regardless of source machine, through a communications sub-system or a hard disk network. System requirements are 128K bytes of RAM and two double-sided floppy disk drives.

Applied Software Technology, Los Gatos, CA.

CIRCLE NO. 176 ON INQUIRY CARD

IBM to Radio Shack link

uMerlin upgrades TRS-80 models I and III to be compatible with IBM PC software. It incorporates an 8088 CPU, 64K bytes RAM and 8K of EPROM. The TRS-80 is used as a slave I/O processor for access to the Radio Shack CRT and keyboard, floppy disks and serial and parallel ports. IBM format CP/M-86 operating system software is included.

Micro Projects Engineering, Culver City, CA.

CIRCLE NO. 177 ON INQUIRY CARD

Tax preparation package

Federal 1982 is a simple, thorough way to do federal tax returns—accommodating 14 schedules and 11 forms. It operates on any CP/M version 2.2 or later operating system. Two 8-in. disk drives are required.

Active Computer Enterprises, Tempe, AZ.

CIRCLE NO. 178 ON INQUIRY CARD

Expense report for IBM PC

Expense-Track-I provides seven fields for data entry: date, description, category, method of payment code, method of payment, tax status, and amount. It can store 2,496 expense entries on a single-sided floppy disk and 4,992 on a double-sided disk and have several files on the same floppy disk. There are a total of 390,001 ways to print and/or display expenses and their totals. Entries can be deleted or modified. It requires 64K, 80 column display, 1 drive, and PC-DOS.

Sapana Micro Software, Pittsburg, KS.

CIRCLE NO. 179 ON INQUIRY CARD

BUSINESS SYSTEMS

IBM-compatible portable

Compaq can run major business and professional software packages used with the IBM PC—including VisiCalc and Wordstar—without any modifications. Housed in a carrying case, the basic system is a self-contained, 28-lb. unit that includes the 9-in. diagonal screen, a 16-bit Intel 8088 microprocessor with 128K bytes of RAM (ex-

pandable to 256K RAM on the main system board), a 5.25-in. floppy disk drive with 320K bytes of storage capacity, and room for an optional second 320K-byte floppy disk drive.



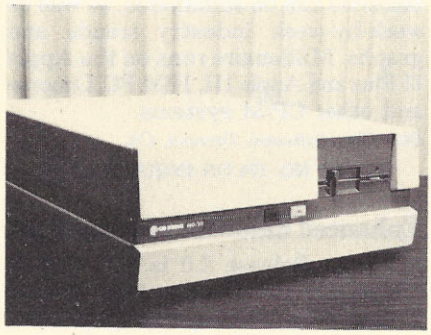
The basic system also includes: a port for an RGB (red-green-blue) color video monitor; a port for composite video; a port for connection to a standard television set through an RF modulator; a parallel printer interface; and a socket for an Intel 8087 co-processor. An asynchronous communications interface and serial printer adapter are optional. Also included are three IBM PC-compatible hardware expansion slots. The expansion slots make it possible to enhance the system with extra memory, extra peripheral attachments and other additions.

Compaq Computer Corp., Houston, TX.

CIRCLE NO. 180 ON INQUIRY CARD

Multi-user system

The CIES 680/30 targets end-users in high-growth companies in the $1-10 million sales range requiring long-term flexibility and expandability. A low profile, 7-in. enclosure allows either a desktop location or rack-mounting. To backup the integrated 10 MB Winchester disk, it utilizes an advanced half-high, thin film 1.6MB 5.25-in. floppy disk drive. A unique back panel design with five connector plates of four different types is featured. Plate types can be intermixed, depending on the system's specific configuration. One plate is designated for asynchronous communications and has four RS-232 connectors and one parallel printer connector; a second plate allows for the ribbon cable connection to the optional peripheral disk enclosure; the third type of plate provides connector locations for a DMA line printer, LAN interface, and RS-232 synchronous communications; the fourth plate can be used either as a filler plate or for custom connectors. A typical maximum configuration would include 768K bytes of RAM, eight serial terminal ports, two parallel printer ports, and up to four 5.25-in. Winchester disk drives each having 10M bytes. Base configuration specifications include 128K bytes of RAM and a communications controller with four RS-232C



serial ports and one parallel printer port, as well as a 5.25-in. floppy disk drive with 1.6M bytes of unformatted capacity, and a 5.25-in. Winchester drive with 10M bytes unformatted capacity. The 680/30 is based on 68000 microprocessor technology, and uses Regulus or Unix System III operating systems.

CIE Systems, Irvine, CA.

CIRCLE NO. 181 ON INQUIRY CARD

32 user 16-bit micro system

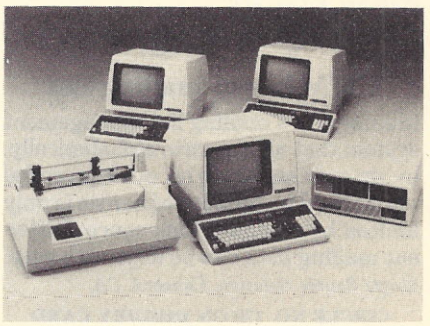
Ensign is a five-processor computer. The main CPU is the Motorola 68000 running at 8 MHz with no wait states. Two Motorola 6801 processors handle all serial I/O for up to 32 users. This frees the main processor from communications overhead. A 6 MHz-Z80B is used to supervise all disk and tape I/O allowing heavy disk/tape I/O without CPU degradation. Another 6 MHz-Z80B is used for memory management, therefore there is no main CPU overhead for memory management. It supports the Oasis-16 and Unix operating systems. The system supports up to 8M bytes of main memory and up to 512K bytes per user, over 1,000M bytes of SMD type disk capacity, and cartridge and 9-track reel-to-reel tape. It is available in desk top or rack mount cabinet.

Integrated Business Computers, Chatsworth, CA.

CIRCLE NO. 182 ON INQUIRY CARD

Multiuser computer from T.I.

The Business System 300 Series are commercial-grade machines and accommodate a wide selection of Winchester disk systems and printer options. The System 300 is based on a single-board CPU using TI's TMS99000 microprocessor. Included are 128K bytes of error-correcting main memory (expandable to 512K bytes) housed in an attractive video display terminal. Each of the five packaged systems that comprise the Business System 300 Series uses a Winchester disk system and can be expanded to include additional terminals. The system uses



the DX10 operating system. Application packages include general ledger, accounts payable, accounts receivable, inventory control, payroll and word processing. The system also supports the UCSD p-system software.

Texas Instruments, Dallas, TX.

CIRCLE NO. 183 ON INQUIRY CARD

Flexible 16-bit system

The Eagle 1600 series uses an 8086 microprocessor operating at 8 MHz and can accept all software created for the IBM PC. The series is designed as a fully-upgradable system with multiple hardware and software options. An entry level version is designed as an individual system for the application that requires processing speed, substantial storage capacity and the availability of an extensive library of software programming for business and other applications. At a minimum, it offers 128K bytes of random access memory and one integral double-sided 5.25-in. floppy disk drive.

Eagle Computer, Los Gatos, CA.

CIRCLE NO. 184 ON INQUIRY CARD

Integrated system

The C-10 is available in a package called the C-10 Super Pak, which fea-



tures, in addition to the basic computer,

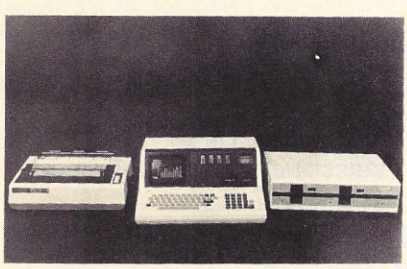
a double-sided, double-density disk drive, a detachable keyboard, and several bundled software packages. The basic computer unit starts at a price of $995 and includes an RS-232 serial port, a parallel port and an RS-232 modem port with full handshake capability. The software packages included are a CP/M compatible operating system, Structured Basic, and three applications packages: word processing, spreadsheet, and portfolio. The CRT is a full 80-character by 25 line display. The system employs the full power of the Z80A microprocessor, operating at 4 MHz, and 64K bytes of RAM. It has a 12-in. green phosphor graphics display and an ergonomic stand.

Cromemco, Mountain View, CA.

CIRCLE NO. 185 ON INQUIRY CARD

Z80A-based system

The FX-9000 is based on a Z80A microprocessor and comes standard with 12K bytes of ROM and one 4K-byte CMOS RAM pack with battery backup. The RAM is expandable up to 32K bytes, and a 16K-byte N-MOS dynamic type RAM pack is also available. A unique feature is the 4K slot-



in C-MOS RAMS. The user can store programs and data on these RAM packs for up to three years. The computer's 5.5-in. green CRT offers dot-addressable high resolution graphics functions.

Casio, Fairfield, NJ.

CIRCLE NO. 186 ON INQUIRY CARD

Winchester and tape backup

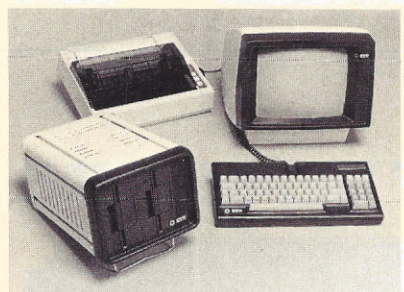
The E'Lite features a 5.25-in. Winchester with integrated tape backup. Included with the system are four business software packages, including Condor's Series 20-3 database management system. The single-user system includes 64K bytes of RAM, 2K bytes of cache memory, and a new generation Z80B processor, with 6 MHz processor speed. The micro is CRT- and printer-independent, and there are built-in controllers for peripherals.

Barrington International Corp., Ann Arbor, MI.

CIRCLE NO. 187 ON INQUIRY CARD

Industrial-grade system

The ETR Star System is an industrial-grade computer with dual 5.25-in. drives; 12-in. commercial green phosphorus terminal with detached keyboard; high speed printer; plus complete on-board software residing on one disk. User ex-



pandable menus and help screens make CP/M transparent with selections to perform utilities, copy files to other computers, and configure it as a database for remote terminals.

ETR Star Systems, Wilmington, CA.

CIRCLE NO. 188 ON INQUIRY CARD

Executive workstation

Kontact combines electronic mail, time management, financial planning, data communications and word processing with voice telephony, and is capable of



operating with any existing analog telephone system. It can perform several data and telephone functions simultaneously.

Mitel Corp., Kanata, Ontario, Canada.

CIRCLE NO. 189 ON INQUIRY CARD

Desktop with 40M-byte capacity

Masterkey 230I features 8-in. Winchester hard-disk storage and four-user capability. Two parallel and four serial I/O ports and one network port are included. Hardware specifications include: 6502 and Z80 dual-microprocessors, 56K bytes static RAM, 400K-byte 8-in. floppy disk drive, 40M-byte 8-in. hard disk drive, and 8-slot, 48-line, M/A-

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CIRCLE NO. 111 ON INQUIRY CARD

COM OSI bus.
M/A-COM Office Systems, Watertown, MA.

CIRCLE NO. 190 ON INQUIRY CARD

10M-byte microcomputer

The PCS-4410 includes: a 10M-byte hard disk; one 5.25-in. single-sided, dual-density floppy disk back-up; 8-bit microprocessor; memory mapped video-display board; disk controller; 10-slot S-100 motherboard; 28-amp power supply; 12-in. video monitor; standard intelligent 62-key ASCII keyboard;



132-column dot-matrix printer; CP/M operating system; and 64K RAM. Options include 5- or 18M-byte hard disk; 16-bit microprocessor; 256K RAM; intelligent 86-key ASCII extended keyboard; single or double dual-density 8-in. floppy disk drives.
Imsai Div., Fischer-Freitas Corp., Oakland, CA.

CIRCLE NO. 191 ON INQUIRY CARD

IBM-compatible unit

The Hyperion was developed for the executive and manager. It is compatible with the IBM PC, and weighs only 20 pounds. The unit offers twice the diskette storage capacity of the IBM and 256,000 characters of RAM. Software



includes the Multiplan spreadsheet; an executive text processor; an electronic mail communications system; and Microsoft Basic. It has hi-res graphics, a 16-bit processor and the MS-DOS operating system.
Dynalogic, Ottawa, Canada.

CIRCLE NO. 192 ON INQUIRY CARD

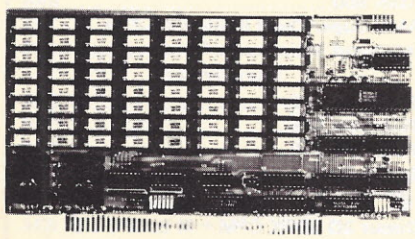
Inexpensive complete system

The Micro Decision is an eight-bit microcomputer based on the Z80A CPU. It includes 64K bytes of RAM, two RS-232 serial ports, a full-size smart terminal with detachable keyboard, and a single-sided 5.25-in. floppy disk drive with 200K bytes (formatted) storage capacity. It uses CP/M 2.2.

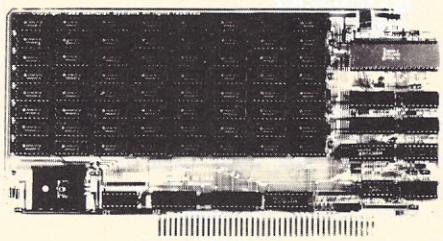


Software included is Microsoft Basic 80, BaZic (compatible with NorthStar Basic), WordStar, the Correct-It spelling

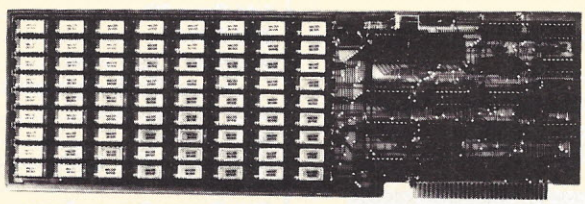
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TRS 80 Model 2



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CIRCLE NO. 69 ON INQUIRY CARD

checker, and the LogiCalc electronic spreadsheet.

Morrow Designs, Richmond, CA.

CIRCLE NO. 193 ON INQUIRY CARD

DATA COMMUNICATIONS

Full duplex, 4800 BPS modem

AJ 4048 is a full duplex, originate/auto answer modem for communications at 4800 bps over dial-up or two-wire unconditioned lease lines. It offers savings for computer network users by eliminating the need for dedicated lines in many applications and by doubling the data throughput in others. Full duplex, 2400 bps fallback



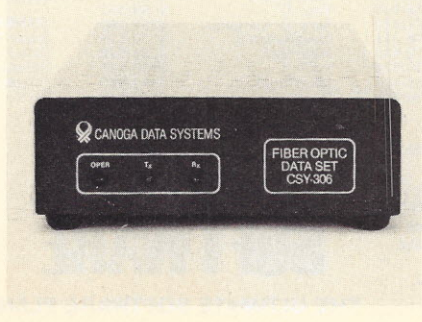
speed is standard. Other features include selectable synchronous or asynchronous operation, data terminal interface via RS-232C connector, extensive front panel display indicators and modern membrane front switches. The unit is available for either stand-alone or rack-mounted applications.

Anderson Jacobson, San Jose, CA.

CIRCLE NO. 194 ON INQUIRY CARD

Fiber optic modem

Model CSY-306T1 modem is directly plug-compatible with high speed, T1-type, 1.5440 megabit/second data devices and provides an interference-free and virtually error-free data channel over distances up to 2 km. The fiber optic cable used between the ends of the full-duplex link is easier to install



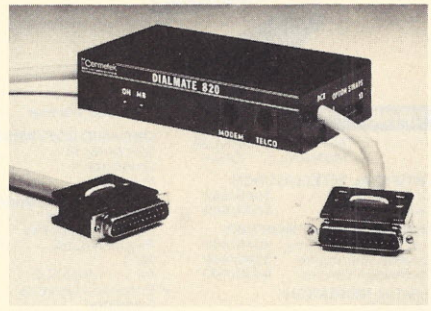
and less than half the cost of conventional wire cable, yet is completely immune to EMI/RFI and unauthorized tapping or monitoring of data. The fiber optic cable can be routed adjacent to existing power lines or conduits, even buried.

Canoga Data Systems, Canoga Park, CA.

CIRCLE NO. 195 ON INQUIRY CARD

Auto-dial modem

Dialmate 820 is an intelligent modem auto-dialer that retrofits to modems that do not auto-dial by replacing the existing modem-to-terminal cable. The dialer receives serial dialing commands



from the terminal keyboard and returns its dialing status for screen display. Once the call is under way, it ignores all dialing commands and is completely transparent.

Cermetek Microelectronics, Sunnyvale, CA.

CIRCLE NO. 196 ON INQUIRY CARD

Intelligent auto dial

The Data Modem 300/1200 Auto Dial and Log-on is a full-feature 212AR with a powerful Automatic Calling Unit built in. It stores up to 12 discrete telephone numbers and log-on sequences and offers four different dialing modes: Memory Dialing, List Dialing, Keyboard Dialing and Auto Redial, as well



as editing and control functions. It features plug-in capability with the Bell System in both the standalone and multiple mountings. All features are accessible from the terminal equip-

ment keyboard.
NEC, Melville, NY.

CIRCLE NO. 197 ON INQUIRY CARD

CNI C-Net interface board

CNI C-NET connects the network medium—the physical data channel interconnecting network stations—with Cromemco's Input/Output Processor, a 4MHz Z80A-based single board computer with program store, for downloading of the network station software. The board includes four programmable counter and timer circuits and an IOP to RS-232 interface, as well as an RS-232 serial input for use with a local terminal. The RS-232 channel is operated in the asynchronous mode with a software defined data rate from 75 to 19,200 baud. Both terminal and modem style connections are provided.
Cromemco, Mountain View, CA.

CIRCLE NO. 198 ON INQUIRY CARD

Radio interface

RadioModem is designed to interface computers or terminals to a VHF/UHF radio. It is targeted for use in remote and/or mobile applications where traditional telephone lines are not available. A pair of RadioModems and associated two-way radios provide a cost-effective alternative to specially installed phone lines, microwave transmission, radiophones with acoustic couplers or other custom engineered transmission systems. The modem operates over point-to-point, multipoint and mobile VHF/UHF frequency modulated communications systems. This unit can be configured for 300, 1200 or 2400 bps asynchronous operation or for 2400, 3600 bps synchronous operation via a five position switch located on the front panel. The external clock can be selected for use with synchronous tail circuit applications. It operates in full or half duplex modes. The unit requires 115VAC or 10.5 to 60V DC.
Gandalf Data, Wheeling, IL.

CIRCLE NO. 199 ON INQUIRY CARD

Data network integration

Entrypoint turns desktop computers into screen-oriented, intelligent data entry systems for standalone or distributed data processing applications; and Passport, which can be used with Entrypoint, provides a tailorable communications link between mini- and mainframe computer hosts. The programs use the portable UCSD p-System that runs on microcomputers built around the 8080, 8085, 8086, 8088, Z80, Z8000, 68000, 6502, TI-9900 and PDP-11 microprocessors.
Datalex Co., San Francisco, CA.

CIRCLE NO. 200 ON INQUIRY CARD

GRAPHICS

Photography for the Apple II

PhotoCaster permits color or black-and-white photos taken with a standard TV camera to be displayed, processed, and, using a self-contained modem, sent between Apple computers over conventional telephone lines. You can add titles and graphics to photos, create special video effects, enhance images, retrieve and store photos on disk, and make automatic slide shows. A built-in high resolution graphics dump routine provides photographic



prints. Black-and-white photos are processed with a resolution of 128-by-128 picture elements and 16 levels of gray. Shades of gray are represented on the Apple monitor by dot dithering. Color photography yields eight-color photos having 16 saturation levels. Color photos are taken using a three frame RGB sequence with color filters. It requires an Apple II or Apple II Plus computer with 48K of RAM and one disk drive.
Commsoft, Palo Alto, CA.

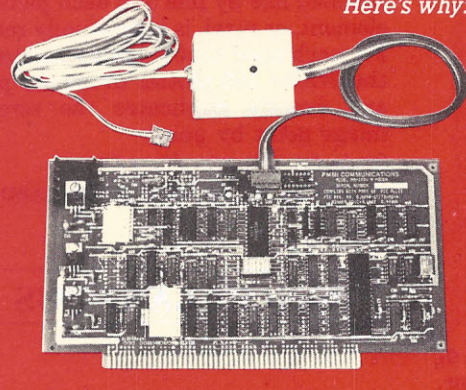
CIRCLE NO. 201 ON INQUIRY CARD

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- You can expect off-the-shelf, UPS-fast delivery. Order with check, VISA, MasterCard or COD.
- MM-103 is installed in minutes. A call to our 24 hour a day modem test center (***703-379-0303*** at 300 baud) allows immediate test & verification of operations.
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If you're not satisfied, return it for a full refund. But, if you find what others have discovered - that the MM-103 is tops in performance & reliability -

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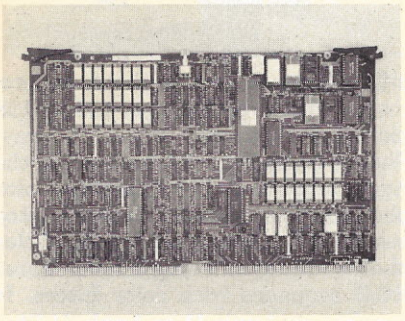
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CIRCLE NO. 120 ON INQUIRY CARD

Color graphic processor module

Versamodule, M68KVM40 for M68000 processor systems has been designed to provide a wide range of color graphics functions with minimal hardware or software design effort by the user. Principal features include: 512 (horizontal) by 384 (vertical) pixels, 8 colors per pixel, 400 color shades available for



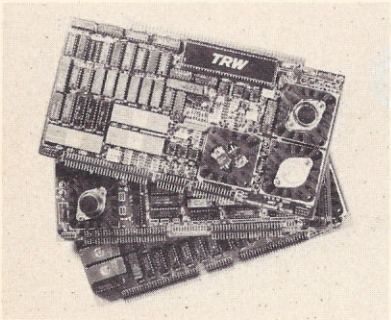
graphic fill, two complete display pages, automatic blink of up to 15 display segments, and 56 powerful graphics primitive commands. It is especially useful for applications in industrial process monitoring and computer-aided design.

Motorola Semiconductor Products, Phoenix, AZ.

CIRCLE NO. 202 ON INQUIRY CARD

Graphic imaging systems

The Cat 1600 Series are high resolution, full color graphic imaging systems with dedicated 16-bit microprocessor, for acquiring, generating and displaying broadcast standard video images. They are sets of boards designed to



plug directly into the motherboard of a standard IEEE-696 host processor. The real-time video flash digitizer, or frame grabber, captures live television images in black and white or RGB real color, and stores them in digital form.

Digital Graphic Systems, Palo Alto, CA.

CIRCLE NO. 203 ON INQUIRY CARD

Color graphics adapter for IBM PC

Colorplus produces hi-res multicolor graphics. Its biplanar technology enables high resolution (640-by-200 pixels) four-color 80-character graphics or medium resolution (320-by-200 pixels) full 16-color 40-character graphics. This contrasts with the current IBM PC capabilities of high resolution one-color 80-character graphics and



medium resolution four-color 40-character graphics. It also enhances the ability to debug program listings by writing over displayed graphic images. It requires only one expansion slot. An integrated parallel printer port is included, thereby saving an expansion slot for other requirements.

Frederick Electronics Corp., Frederick, MD.

CIRCLE NO. 204 ON INQUIRY CARD

Hi-res graphics plotter

StrobeHiRes plots high-resolution graphics directly from the Apple II and Apple III screens. Using a simple screen-dump program, the high-resolution Apple screens are automatically scanned line by line and each picture element, or pixel, is individually read. For each pixel that is active (lighted), the Strobe 100 plotter drops the pen and exactly duplicates the screen image point by point.

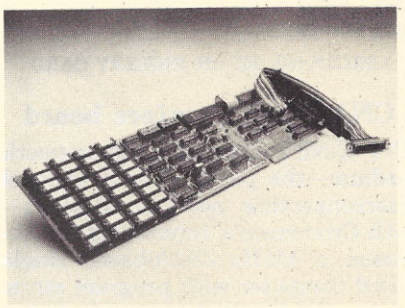
Strobe, Inc., Mountain View, CA.

CIRCLE NO. 205 ON INQUIRY CARD

MISCELLANEOUS

Board enables IBM PC expansion

Quadboard takes functions usually requiring four of the IBM PC's five slots and combines them onto only one board requiring just one slot. The machine is then left with four slots for future expansion instead of just one. It contains a serial RS-232C async communications port, a Centronics parallel printer port, up to 256K of



RAM and a real time clock-calendar.

Quadram Corp., Norcross, GA.

CIRCLE NO. 206 ON INQUIRY CARD

Combo board for IBM PC

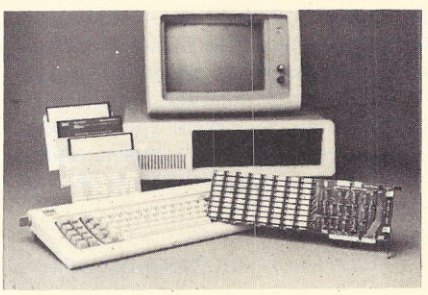
Datamac combination memory expansion/asynchronous communications controller board contains up to 256K bytes of memory and can be configured with either one or two asynchronous communications devices. The board frees expansion and I/O slots so that other board functions may be added.

Datamac Computer Systems, Sunnyvale, CA.

CIRCLE NO. 207 ON INQUIRY CARD

Memory board for IBM PC

UltraRAM add-on memory boards have single slot sizes that range from 128K bytes to 512K bytes. Features standard on each board are: Programmable Start Address—switch selectable on 64K boundaries anywhere in the 1M-byte address space; Programmable Block Enable—switch selectable Enable/Disable for each on-board 64K-byte block; Parity Detection



Circuitry—parity enable/disable (no-latch) switch and parity alert LED; and Fully Expandable-Socketed Memory Array—all boards fully socketed so a 128K board can be upgraded to 512K by adding 64K DRAMS. They are plug-compatible with IBM RAM expansion cards.

Daystar Systems, Dallas, TX.

CIRCLE NO. 208 ON INQUIRY CARD

SuperPet upgrade board

Single board upgrade (part number 900003501) will convert the CBM 8032 microcomputer into a SuperPet. The standard model 8032 contains 32K of RAM and includes Basic. With the SuperPet board, the upgraded machine will feature an RS-232 interface, 64K additional RAM in 8K RAM chips, standard 6502 microprocessor as well as a pseudo 16-bit 6809-based processor. An external switch for processor selection also allows programs designed for the 8032 to operate without modification. The upgrade provides six languages, including Waterloo Computing Systems Limited's MicroBasic, MicroPascal, MicroFortran, MicroAPL, MicroCobol, and 6809 Assembler.

Commodore Business Machines, Wayne, PA.

CIRCLE NO. 209 ON INQUIRY CARD

CP/M for Apple II

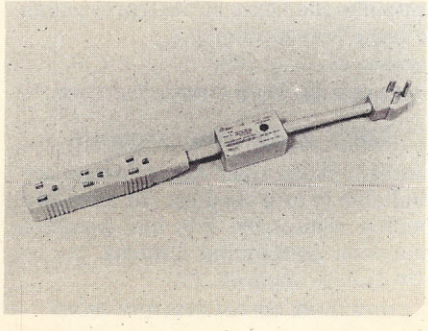
Appli-Card allows Apple II or Franklin Ace to run CP/M packages without using other cards and without any hardware or software modifications. It comes standard with full speed 4 MHz Z80A and 64K on-card memory for application development and execution. Other features include 70 column high resolution graphics, 2K to 8K on-card EPROM, a real time clock full 96 upper and lower case ASCII characters, menu-driven set-up, an expansion interface and 40 to 255 column horizontal scroll. It also permits users to run 6502 and Z80A or Z80B processors at full speed simultaneously.

Personal Computer Products, Rancho Bernardo, CA.

CIRCLE NO. 210 ON INQUIRY CARD

Transient surge suppressor

Clipper Model C-120Q is a three input Model C-120Q unit designed for direct installation by an end-user. It is a parallel protection device, which means that the normal amperage sustained by the critical load being protected can vary depending on equipment type with no loss in suppression performance. It is designed as a portable, user



applied, 18-in. extension cord with three outlets for output connection and one plug for input connection. The Clipper is bi-directional, bi-polar, has a response time of less than 5 nS and is capable of withstanding up to 6000 V. A non-replaceable 15A fuse provides overload protection and an LED pilot light indicates operation.

Dymarc Industries, Baltimore, MD.

CIRCLE NO. 211 ON INQUIRY CARD

Program generator

EZ-PROG program generator features automatic file definition and update functions, allowing the novice to create data files and reports. Efficient coding provides reduced overhead and creates



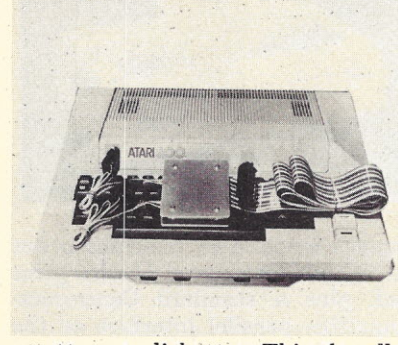
independent, documented source code allowing program modification for performing special functions. It is compatible with Data General Systems equipped with Extended Basic software.

New England Systems Technology, Hopkinton, MA.

CIRCLE NO. 212 ON INQUIRY CARD

Printer interface for Atari

Interface No. 1 allows connection of any printer with a Centronics-compatible parallel interface to an Atari 400 or 800 via Controller Jacks J3 and J4. A printer-handler is provided on either



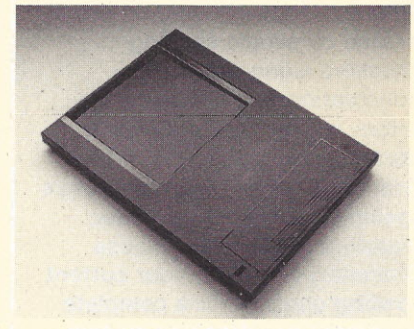
cassette or diskette. This handler replaces the resident printer-handler, occupies less than 128K bytes of user program area, and is compatible with all Atari cartridges and programs.

Looking Glass Microproducts, Loveland, CO.

CIRCLE NO. 213 ON INQUIRY CARD

Unique data storage

Alpha-10 cartridge drive storage subsystem uses 8-in. flexible disks enclosed within rigid cartridges. The cartridge



combines the high performance of rigid disks with the low cost removability of flexible disks.

Iomega Corp., Ogden, UT.

CIRCLE NO. 214 ON INQUIRY CARD

Hard disk for Eagle

The File 10 provides a total additional storage capacity of 10 million characters, or approximately 7,000 pages of text on its 5.25-in. hard disk drive. The unit weighs 18.5 lbs. It is compatible with any of the line of Eagle computers, and CP/M operating system software is included.

Eagle Computer, Los Gatos, CA.

CIRCLE NO. 215 ON INQUIRY CARD

Hard disk enhancement

Davong hard disk system allows users of the Apple II, Apple III and the IBM PC to expand computer storage to up to 15M bytes formatted (19M bytes unformatted) memory.

Davong Systems, Mountain View, CA.

CIRCLE NO. 216 ON INQUIRY CARD

Program development for Oasis

PDQ supports the external definition of database structures, and CRT input masks, which can then be used to generate sophisticated maintenance programs. The programs generated are Oasis Basic programs and support multiple screens, five levels of security for each of the standard maintenance functions (add, modify, delete, inquire), field input editing, and field verification against secondary files. It also generates menu programs, and includes a reporter, which allows a nonprogrammer to design a simple report.



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CIRCLE NO. 7 ON INQUIRY CARD

Functional Solutions, Utica, NY.

CIRCLE NO. 217 ON INQUIRY CARD

Printer cable for the IBM PC

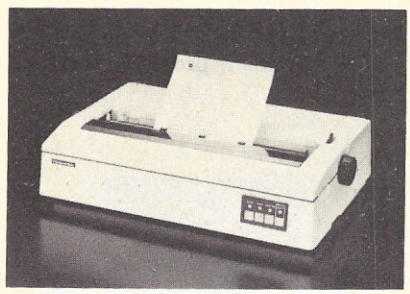
SoftCable serial printer spooling gives IBM PC users back the processing time normally lost to printing delays, while helping them sidestep the problem of serial printer interfacing. It interfaces all common serial printers to the IBM with one standard cable definition. It adapts to the control lead and protocol requirements of the various printers by software reconfiguration alone. SoftCable's spooling function collects printed output in an in-memory buffer at the speed it is generated, and sends it to the serial printer at the speed it can be printed. Editing, spreadsheet processing or any other computing can continue without waiting for output to complete. Buffer sizes are selectable from 1 byte to .5M byte. The package includes pre-configured drivers for common printers, a screen-oriented configuration editor, and a command facility with status and help functions. It uses PC-DOS with one or two IBM-compatible asynchronous communications adapters.

The Gauge Group, Phoenix, AZ.

CIRCLE NO. 218 ON INQUIRY CARD

Versatile printer

P1350 LetterPerfect printer combines output capabilities for word and data processing applications with high-resolution graphics production. It operates at 100-cps for letter-quality word processing output. It runs at 160-cps for draft-quality data processing requirements and also offers a



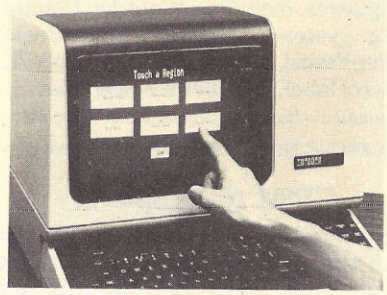
graphics mode. The 132-column dot matrix unit features a 24-wire print head, plus a standard Centronics-compatible parallel interface or the optional RS-232C serial hookup. Three different character fonts are software-selectable.

Toshiba America, Tustin, CA.

CIRCLE NO. 219 ON INQUIRY CARD

Touch system for DEC VT100

An infrared touch input system for the DEC VT100 allows for innovative diagnostic routines and down loadable format. Infrared LEDs are mounted on the side and bottom of a window frame composed of printed circuit cards. Phototransistor detectors are mounted opposite the emitters to form an X-Y grid of infrared light beams. The beams are not visible to the user, yet each point where an X and Y beam intersect is a touch point. The window



frame is mounted directly on the VT100 terminal so that the beams of light are parallel to and directly in front of the display surface. The window area is scanned repeatedly to detect whenever a light beam has been broken. It is designed to work in high ambient light conditions. No keyboarding or computer skills are required for operation.

Carroll Touch Technology, Champaign, IL.

CIRCLE NO. 220 ON INQUIRY CARD

Two-color display monitor

The CD-2 consists of a standard 19-in. monitor, channel interface, 393K memory, video display board and 48-bit Fortran processor. Other features include: software operated cursor and color palette, blink any color and an interface to allow synchronization with external video for overlaying video on PGM generated graphics. The video output generated by the CD-2 can be used to drive many different video devices such as video to 35mm film units like the Dunn or Matrix cameras or large screen displays.

Superset, San Diego, CA.

CIRCLE NO. 221 ON INQUIRY CARD

Disk filing and storage

Swedish-made disk filing boxes are available in four models. All offer key locking removable lids and positive snap-lock positioning indexes.

ABA Systems, Nashville, TN.

CIRCLE NO. 222 ON INQUIRY CARD

Modular desktop furniture

Floppy Fingers, The Bridge, & Floppy Drawers are oak units featuring contemporary design with unique disk storage capabilities allowing random selection of any disk by label. Provisions are made for housing disk drives, manuals, monitor and accessories as well. With available add-on modules, the system can expand as required in



user-customized configurations, enabling the user to create a custom workcenter on any desk or table.

Venice Woodworking Co., Los Angeles, CA.

CIRCLE NO. 223 ON INQUIRY CARD

Carrying cases for Commodore

The CM703 case will hold the Model 64 computer along with one or two 1541 disk drives as well as the power supply, while the CM704 case will hold



the Model 64 computer, along with the dataset program recorder and the power supply. Both have room for additional equipment.

Computer Case Company, Columbus, OH.

CIRCLE NO. 224 ON INQUIRY CARD

Molded cases

The Compac case is available for the Apple II computer and two disk drives.



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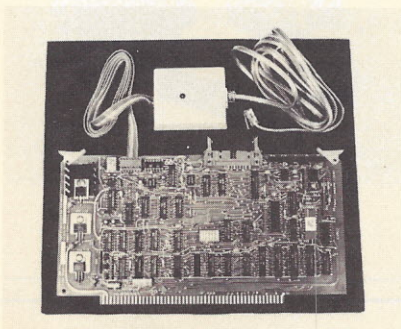
*CP/M is a Digital Research trademark. A 52K CP/M system is required.

It is constructed of high impact plastic with a rib design for added strength. The standard size is 23-in. L, 18.25-in. W, 9.5-in. H, and the case weighs 12 lbs.
Wayne Nall Enterprises, Redondo Beach, CA.

CIRCLE NO. 225 ON INQUIRY CARD

Encoder/Decoder

The MMVT1 allows data entry and access with nothing more than a touch-tone phone. Computer replies in a synthesized voice. It uses an unlimited vocabulary, phoneme-type speech synthesizer with adjustable volume and software-controlled pitch. It sends (and



receives) all 16 touch-tones, which it has encoded from binary data. Interrupts are fully software-controllable, and it answers and dials the phone automatically. It is FCC-registered for direct connection to the phone line and IEEE/S-100 compatible.
PMMI Communications, Falls Church, VA.

CIRCLE NO. 226 ON INQUIRY CARD

TERMINALS

Portable terminal

Computer Transceiver Systems has added a new 1200 baud/120 cps portable printing terminal with buffering and editing capability to its Execuport 4120 Series. Designed to cut costs by reducing transmission time, it can prepare edited messages off-line for later on-line transmission at up to 120 cps. Memory peaks out at 43,000 characters. It can both send and receive at 120 cps. Terminal users have in the past paid high rates for sending data to computers, because very few typists can exceed speeds of seven characters per second. With the 4120 BSR, a block of copy that an experienced typist could produce and enter in one hour can now be transmitted from memory, fully edited, in about four minutes. The unit has a 16-element columnar printhead that produces high-resolution characters. Fully-formed descenders permit printing below the line with no paper movement and no decrease in throughput speed. It is equipped with two character fonts. The 9-by-11 font can print both standard and high resolution copy at 10 characters-per-inch. The 5-by-7 font produces 16.75 character-per-inch compressed print, which permits full 136 character-per-line printout to fit on standard 8.75-in. wide paper. By using



software control from a host computer, two 24-by-80 format pages can be printed side-by-side on the same width paper. A choice of modems will be offered. The 3400/103 (originate mode only) is acoustically coupled or hard-wired through a modular jack. The 212/103 (direct connect only) works in both the originate and answer mode. The 103 (acoustic only) operates at low speed (300 baud) in the originate mode. These built-in modems permit communication at either 300 or 1200 baud. The 4120 can communicate at up to 9600 baud through the RS-232 port. The operating modes of the terminal system can be changed directly through keyboard instructions. A command key approach is used to set parameters.
Computer Transceiver Systems, Inc., Paramus, NJ.

CIRCLE NO. 227 ON INQUIRY CARD

Display terminal

The Esprit III is a high-performance terminal that emulates the TeleVideo 950 with significantly lower pricing. It has been designed to meet various



applications such as data entry, data inquiry, systems control and software development. It uses a 6502 microprocessor. It also incorporates a switch-selectable foreign power option, a printer buffer and a bi-directional auxiliary port with independent baud rate selection.
Hazeltine Corp., Greenlawn, NY.

CIRCLE NO. 228 ON INQUIRY CARD

Executive-style terminal

The Model 16 has a user-definable keyboard and a four-function calculator built into the numeric keypad. Also incorporated is a clock that displays either time of day or elapsed time on the 25th line. The terminal can be configured to specific needs and applications. 166 user-definable characteristics are presented in clear English notation, in either full-page menu format or category by category on the 25th line.



Typical of these user-definable characteristics are brightness level, communications rates, number of columns per line, lines per page, margin limits, smooth scroll rate and data flow con-

trols. Additional features include four pages of display memory (optionally up to eight pages, non-volatile), two bi-directional, buffered communications ports, ANSI X3.64-compatibility, and a detached, sculptured keyboard with 64 user-definable macro keys.

Teleray, Minneapolis, MN.

CIRCLE NO. 229 ON INQUIRY CARD

Color graphics display

The NJC-C1421 Color Graphics Display Terminal is suitable for business graphics, CAD, CAM and CAE applications. It combines a high resolution monitor, graphics processor and communications package into a compact desktop unit with the following features: 14-in. hi-res screen, 1024-by-780 dot resolution, 27 colors, 16 at one time, 800ns/dot high-speed drawing, and 0.21mm pitch shadow mask CRT.



Nippon Computer Co., Tokyo, Japan.

CIRCLE NO. 230 ON INQUIRY CARD

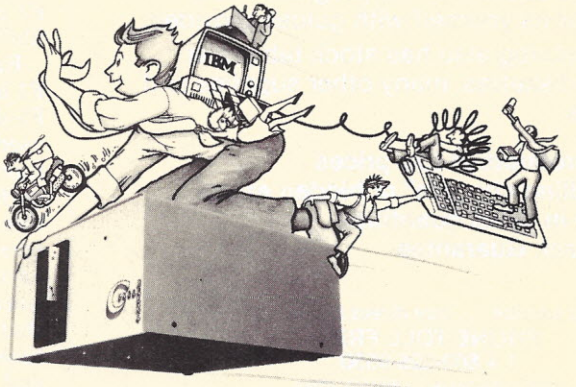
Word processing terminal

Ergo 4000 is a full-page word processing terminal displaying 66 lines by 80 characters of text on a single screen. It is compatible with VT100 in both ANSI and VT52 mode, and may also be reprogrammed by the user to emulate other popular terminals by assigning different control codes and escape sequences for normal terminal functions. Standard features include four video attributes, bidirectional pass through printer port, fifteen user-programmable function keys, saveable set-up mode, and alternate character generator. Also included are diagonal cursor movement, settable margin bell and tabs, screen saver and transparency mode. The green, non-glare screen tilts a full 25 degrees to accommodate any viewing angle, while the detached keyboard contains an integrated palm rest and ten key numeric pad. The unit's on/off switch is on the front, and screen brightness may be controlled from the keyboard.

Micro-Term, St. Louis, MO.

CIRCLE NO. 231 ON INQUIRY CARD

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CIRCLE NO. 60 ON INQUIRY CARD



Word Processing

Continued from page 27

What if the back-up disk has problems now or in the future? It must be returned to the company for a replacement—leaving you with only the original from which to work.

EasyWriter too has a built in back-up "protection" that prevents more than a single back-up copy to be made. You cannot make a second copy of the copy. Our initial copy had a number appear mysteriously within the center of every file; it increased in digits each time we saved and recalled the same file until an entire line of text line was replaced by numbers. We could not make another copy from the original. We could only send it back and wait for the replacement.

There is no such limitation with WordStar. I tend to keep three or four disks going with WordStar on it in the A drive, because I can use the additional storage on the disk for frequently-used files—addresses, page headings—and these vary with the disk. However, for users with less writing volume, a single working disk might be adequate.

With all three programs, study the licensing agreements and disclaimers carefully before you buy the program or open the package.

Among the features of the IBM PC are ten user-definable F keys. Volkswriter takes advantage of them, so that each key by itself performs one essential function. Additionally, each key combined with the Alt key performs ten more functions. For example: F1 brings up the "help" menu; Alt F1 is the print command. F2 is the command for "write file"; Alt F2 is "read file," etc.

EasyWriter uses each F key for a single function including F1 help; F2 print; F3 insert line: F4 additional commands, F5 delete word, F6 undelete word, etc. The Alt key is not used at all in the program. F10, which has an important function, does not show up on the menu. The F keys do perform other functions that can be defined by the user; this is a unique and valuable feature. The user can embed commands in a text, or convert ASCII code symbols to a variety of custom commands such as assigning an entire word or string of words to one key symbol. That means that if you use a name often, instead of printing it out each time, you simply hit that key to which the name was assigned and the entire string will appear.

WordStar also assigns a certain function to each F key (normally requiring two keys in other hardware applications). They include: F1 help, F2 indent paragraph to tab, F3 set left margin to cursor; others are for block moves, underline and boldface, and cursor movements to beginning and end of file. WordStar uses the numerical keypad too for cursor movements, home, page up scrolls and more.

Easy-to-see menus

The Volkswriter menus are neatly set apart from the textwriting area of the screen with a box. You can easily jump from one menu to another. A status line displays the bytes available.

One problem is that when you are editing, you are in one menu. When you want to print, you completely leave the edit mode and change to a print selection mode. Here you have the opportunity to format your text, using the defaults previously set for margins, justification, characters-per-line, lines-per-page, etc. You can change them, but you don't really see how they appear on the screen at any time. By setting the "space between lines" to 1, double spacing is printed. But if you want to see your document double-spaced on screen, you are advised to enter two carriage returns as you type.

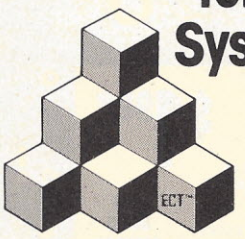
EasyWriter menus are displayed between dotted lines and you select your choices from two menus; one contains commands such as *C*lear, *E*dit, *G*et a *F*ile, *R*evise file and *S*ave a file along with a list of what the special F keys do. Key F4 replaces the first menu with "additional commands" that cover formatting procedures, tabs, word count justification, search and replace, and request to print. F1 brings up the help menu for the F keys. Hitting it again (most are on/off toggles) will remove it to allow full screen editing. The status line tells you the current drive and filename, number of bytes available, files linked and current command.

EasyWriter has several interesting print features; you can watch the text on the screen as it is being printed. By placing your cursor at the beginning of a paragraph, you can delete that paragraph from the document. It's a convenient feature for eliminating selected lines and paragraphs from letters. You can also slow down or speed up printing. Only EasyWriter supports multiple copy printing. Both EasyWriter and Volkswriter have file merge capabilities. Not WordStar—you'll have to buy another program, MailMerge, to accomplish these two tasks.

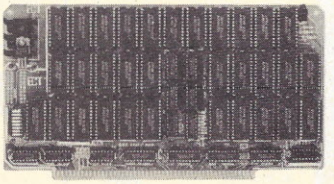
WordStar has six basic menus and several sub-menus to help every step of the way. The WordStar display is not boxed off from the text, but your hardware contrast button can be adjusted so that the headings are highlighted. It is somewhat confusing and busy on screen. However, the menu can be deleted from the screen and called back as needed (also true in the other programs). When one is pro-

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ficient with the system, it is easy to refer to the excellent prompt card that lists all the commands with references to the manual.

A status line in WordStar is always displayed at the top of the text with the drive and file name, page number, line number and column number of the text and whether INSERT mode is on or off.

Formatting in WordStar is accomplished using various commands in the "O" menu. The formatted document appears on screen exactly as you will see it printed out. You can readily change right and left margins, line spacing from one to multiple spaces, tabs, paragraph indents. On/off toggles activate margin justification, page break display, word-wrap, automatic hyphens and more. Such things as page length, foot and head margins are changed from the default by use of dot commands. For example, by placing ".op" at the top of a letter, a page number will not print at the bottom. A heading is added with ".he title to be printed page #". Everything will happen automatically on subsequent pages.

Among the many advantages of word processing over typing is the ability to select and move blocks of text from one part of a typed section to another. All word processors perform this function, but in different ways and sometimes for different reasons.

In Volkswriter, a block is defined with the F5 and F6 keys, which place an arrow before and after the copy to be moved. The Alt F5,6,7, and 8 keys control moving that block to another file for use later, to another place where the cursor has been set, or for copying it or deleting it. Writing a block to another file and reading files back into copy are critical functions when a text is too large to be stored in memory at one time. The moves are incredibly fast.

Block moves with EasyWriter seem to plod along by comparison. They are set by using the insert key in conjunction with the F8 for beginning of block and F9 for block end. The program stores the block in a buffer. After you place the cursor where you want the block to appear, you must make space for it, then press the Cntrl and G keys to bring it back from the buffer. The block copy requires more steps. In a 64K-byte system, a maximum block move is 2,000 characters; in systems with more than 64K of usable memory, you can move or copy up to 4,000 characters.

WordStar block moves, defined with the keys F7 and F8, shift quickly into place and they are highlighted, so you know exactly what portion of a text is included. They are limited to 900 characters in a 64K system; larger in systems with greater space. To overcome these limitations in both systems, the user is advised to copy portions of a block at a time. However, when writing blocks to new files, one must be careful; as each time copy is placed in a file, it erases everything that was previously written into that file. Therefore, each block must be placed in an individual file, then recombined by reading each file into a new single file.

One feature I looked forward to testing was the EasyWriter "undelete." This is the availability to call back a portion of typing that you have deleted to remedy the malady of hitting the wrong key and losing a word or a line or changing your mind. In practice, it only permits you to undelete a character or a word (not an entire line or paragraph) and only if you have not moved the cursor since the character or word was deleted.

Only EasyWriter provides two other plus features: word count and indexing. Indexing allows you to generate a table-of-contents and a page-by-page reference to it. (Word index programs usually cost about $150-$200 extra.)

WordStar has a non-edit mode for writing programs and other non-text applications. EasyWriter may be used to write and edit source files for a program to be compiled or interpreted—provided the sources files may be stored in an ASCII format. Volkswriter's edit mode is disabled by removing the last 'margin set slash' to turn off word wrap.

Saving a back-up of a file you are working on is an accepted practice to prevent accidental loss of text. Most programs create such a back-up automatically, but this is not so in Volkswriter. When you save a file, you are asked whether or not you wish to retain the previous one. If you say "no" and some unexpected horror affects your file, you're out of luck.

How do they compare?

It is impossible to treat all the aspects of these three programs in a short survey, but following are my recommendations with the conditions explained.

WordStar is the most comprehensive all-around word processor to date for use with the IBM PC (and the CP/M version with the baby blue board) if you need a powerful program to deal with daily text editing. It probably doesn't take full advantage of all IBM PC features in the present version. You will need MailMerge to accomplish chain, or link, files that are included in the other programs.

WordStar is allegedly supported by dealers, but most dealers are not familiar enough with all the commands and potentials to take you beyond the basics. Questions will be answered by a MicroPro customer service department. Because WordStar has such a lead in the market, there are classes, tutorials and people who know how to use it. Finding help should not be difficult through stores, adult education programs and user groups.

Volkswriter is a competent, easy-to-use program for those whose word processing needs are not the total reason for having a computer and do not require manipulating large text files. Volkswriter's user-created files can be edited by WordStar. Both might be a good choice in an office with fast employee turnover. The easy tutorial can be quickly learned. For more complex applications, the same files could be transported to the WordStar user. However, WordStar files cannot be edited by Volkswriter.

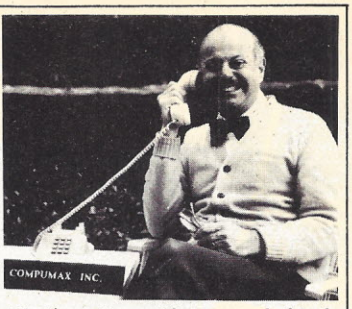
EasyWriter might be considered an in-between choice and has an edge for users who wish to redefine certain commands for specific uses. It has more functions than Volkswriter but less than WordStar. It's user definable functions are an advantage.

It is important to note that EasyWriter 1.1 is not a revised version of the EasyWriter 1, which was deemed unacceptable by users when issued initially. A spokesman said it is an entirely new package, written in C language.

Regarding after-sale support, telephone help with EasyWriter problems will cost the user additional money. IUS charges an additional 20% for telephone support on a toll-free number. Dealers will get the support free and can pass answers to end-users. □

Contributing editor Dona Z. Meilach is the author of over 65 books and hundreds of magazine articles on a variety of subjects. She is hooked on computers for the creative process. She is currently writing a novel, a book about computers, and is conducting author workshops and tutorials on word processing and spelling systems.

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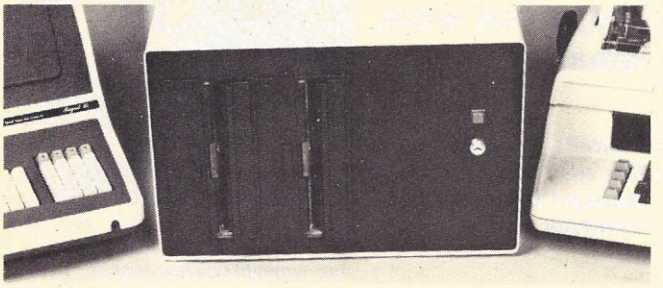
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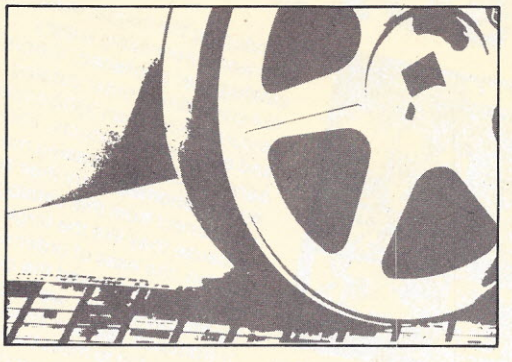
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Portables

Continued from page 30

ing built-in functions: a 10-digit calculator, a clock/controller to keep track of appointments and a file system.

Different as they are, both CompuCase and Olympia are among the first to capitalize on the businessperson's growing passion for mobile computer power. Placing the systems in familiar cases helps to reduce user-resistance and keep overly curious observers at bay.

—DWP

Stock Watcher

If you're into stocks, bonds, commodities or the like, the accompanying pocket computer program should prove useful. It will answer the question of how an item of interest is performing compared to an index of similar items. For example, a group of transportation stocks can be compared to the Dow Jones or Standard & Poor's transportation index.

As listed, there's room for up to 15 items grouped into three types, with an index for each type. Three periods of data are held for each item so that the previous three-day average can be compared to the current average for the same period. The number of days or periods to be averaged can be changed in line 500 by assigning the appropriate value to I. The value of I must be greater than 2, giving one set of elements for names and at least two sets of data to be averaged. The upper limit is only a function of memory available.

The data array can be thought of as a set of I columns with E elements in each column. The first element of the array is loaded as A$(F+1), where F is the number of variables used by the program. Therefore increasing the number of columns (I) means decreasing the number of items per column (E). As listed, there is room for nine elements and six columns (5-day average). With I=4, as listed, a 3-day average is available for 15 elements.

A,B,C (and D, if needed) establish the number of elements in each type. For example, A is set equal to 3. The first element is the index for this type and there is room for two elements in this type. B=5 and C=10 give room for an index and four elements of type B and an index and nine elements in type C. A,B and C are completely variable and can be set as needed in line 500. If only two types are needed, set C=0. Note that the look in line 200 and line 410 must be changed to: FOR J=1 TO 2. D is not presently in use and can be used for a fourth type. Change line 200 and line 410 to for J=1 TO 4. and add D as needed in line 500.

As listed, item names begin at A$(17), F+1=17. If these names can be entered manually, the edit segment beginning at line 400 can be deleted. Several hundred bytes would then be available for data. The same is true of the edit data routine beginning at line 300. However, since errors are bound to occur, this routine will be helpful occasionally. Additional space can be saved by deleting the option display in line 5 and shortening prompts.

The output format assumes the printer will not be used (e.g. the index change is presented with each element change). If a printer will be used, the output format should be modified.

A note on data entry: The fractions given in stock quotes can be entered using the computational feature of the computer. 13 7/8 can be entered as 13+7/8. The computer will actually enter 13.875. Naturally, the appropriate decimal value can be entered directly.

To use the program, use the data of the sample run to be sure the program has been loaded correctly. Then type CLEAR and begin entering the data you will actually use. Follow the procedure shown in the sample run. Enter item

names first. Remember that the first item of each type is the index for that type. Then use the edit section to enter the first three periods of data. When previous data has been entered, the program is ready to use.

Perhaps the easiest way to add a new item is to replace a previous item of the same type and load data daily, ignoring output for the first three periods. Also note that an item no longer of interest can be passed over each day by entering zero. It may be a good idea to leave room in each type for one or two additional items in case of future need. If parameters are changed, it will be necessary to CLEAR and use the above start-up procedure.

Contributing editor Bob McElwain is a graduate of Pepperdine College with an MA in Mathematics from Boston College. He works with Los Angeles City Schools as a Computer science instructor, and as a software consultant for business and industry. He's the owner of Hanco Software (Sylmar, CA), specialists in software for handheld computers.

Variables used

```
A = Number of type A stocks.
B = Number of type B stocks.
C = Number of type C stocks.
D = Not in use.  Available for another type.
E = Number of elements in one period.
F = Number of program variables.
G = Hold type index.
H = Count of elements in a period.
I = Number of periods. I-1 is the number
    of periods of data to be averaged.
J = Count types of stocks.
K = Count stocks within a type.
L = Count elements for average.
M = Accumulate and compute last average,
    then amount of change from this average.
N = Accumulate and compute current average.
O$ = Temporary value.
P = Index to array.
A(1)-A(16): Program variables, as listed
            above.
A$(F+1)-A$(F+E): Stock and index names.
A(F+E+1)-A(F+2E): First period of data.
A(F+2E+1)-A(F+3E): Second period of data.
A(F+3E+1)-A(F+4E): Third period of data.
```

Program listing

```
 5: " ": PRINT "STOCK"
    - Display options.
10: PRINT "A-ADD DATA"
  : PRINT "D-EDIT DATA"
  : PRINT "N-EDIT NAMES"
  : GO TO 10

    ***  ADD CURRENT DATA  ***
```


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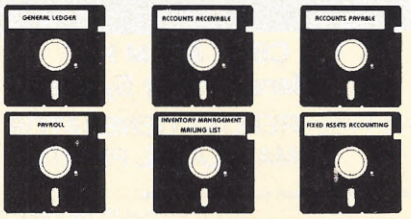
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```
100: "A": PRINT "ADD CURRENT DATA"
     - Get initial data.
   : GO SUB 500
     - Get data. Begin count of elements.
200: H=F
     - Loop for three types of stocks.
   : FOR J=1 TO 3
     - Loop for stocks of a type. Note that
       A(1)=A
   : FOR K=1 TO A(J)
     - Increase count of elements.
   : H=H+1
     - Set to accumulate for last average.
   : M=0
     - Set to accumulate present average.
   : N=0
     - Loop to accumulate averages.
205: FOR L=1 TO I-1
     - Set index.
   : P=L*E+H
     - Accumulate for last average.
   : M=M+A(P)
     - Accumulate for present average.
   : IF L>1 LET N=N+A(P)
     - Shift data back for new entry.
   : A(P-E)=A(P)
210: NEXT L
     - Get last average.
   : M=INT(100*M/(I-1)+.5)/100
     - Get new data.
215: PRINT A$(H)

   : INPUT "TODAY? ";A(P)
     - Confirm entry was correct.
220: PRINT A$(H);" ";A(P)
   : INPUT "OK? ";O$
     - Return on entry of any character.
   : GO TO 215
     - Accumulate for average.
225: N=N+A(P)
     - Compute current average.
   : N=INT(100*N/(I-1)+.5)/100
     - Output results.
   : PRINT A$(H);" AVE=";N
     - Compute change in average.
   : N=N-M
     - M can be zero, if no previous data
       exists.
   : IF M=0 LET M=1
     - Compute percent of change.
230: M=INT(10000*N/M+.5)/100
   : IF N>0 PRINT "UP ";N;" ";M;" %"
   : GO TO 240
235: PRINT N;" ";M;"%"
     - If this is the index of type, hold
       percentage value and skip output
       of comparison to stock.
```

```
240: IF K=1 LET G=M
   : GO TO 250
     - Output stock and index change.
245: PRINT A$(H);" ";M;"% INDEX ";G;"%"
250: NEXT K
   : NEXT J
   : PRINT "END OF ENTRY"
   : GO TO 10

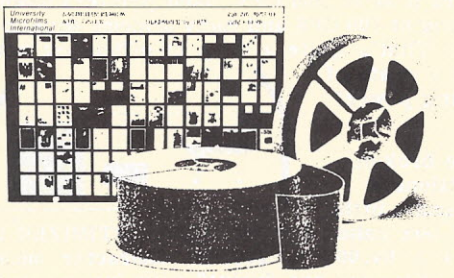
     ***   EDIT DATA FOR A PERIOD   ***

300: "D": PRINT "EDIT PERIOD DATA"
     - Get initial data.
   : GO SUB 500
305: INPUT "PERIOD TO EDIT? ";L
   : L=L+1
     - Test for legal range.
310: IF (L<2)+(L>1)>0 THEN 305
     - Loop for elements of a period.
315: FOR J=F+1 TO F+E
     - Set index to element needed.
   : P=J+(L-1)*E
     - Output present data.
   : PRINT A$(J);" ";A(P)
     - Use ENTER only to leave unchanged.
   : INPUT "OK? ";O$
   : GO TO 325
320: GO TO 330
     - Get new data.
325: INPUT "NEW DATA? ";A(P)
330: NEXT J
   : PRINT "END OF PERIOD"
   : GO TO 10

     ***   ENTER STOCK AND INDEX NAMES   ***

400: "N": PRINT "EDIT STOCK NAMES"
     - Get initial data.
   : GO SUB 500
     - Begin count of elements.
410: H=F
     - Loop for three types of stocks.
   : FOR J=1 TO 3
     - Loop for stocks of a type.
   : FOR K=1 TO A(J)
     - Increase count of elements.
   : H=H+1
     - If K>1, not an index.
   : IF K>1 THEN 430
     - Here for name of average.
420: PRINT "TYPE #";J;" NOW ";A$(H)
   : GO TO 435
     - Here for stock name.
430: PRINT "NOW ";A$(H)
     - Use ENTER only to leave unchanged.
435: INPUT "OK? ";O$
   : GO TO 445
440: GO TO 450
     - Get new name of index or name.
```


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EASI "4+" ($1250.00) all of the above plus the following features:

RELEASED MOMENTS — end moments can be released on individual members.

IMPOSED DISPLACEMENTS — nodes can be set to a predetermined displacement prior to the analysis.

THERMAL LOADS — accounts for temperature changes in the structure. Typical uses of this feature are steam pipes, uneven solar heating, and the effects of welding.

3D PLOTTING ON DOT GRAPHICS PRINTER (graphics screen) — When a mode is three dimensional, the program prompts the user for rotations (degrees) about the x, y, & z axis, then plots (with amplified displacements) that view. A low resolution graphics option is also available for 80 column screen display or standard printers.

WEIGHT REPORTING — tabulates structural weights by material type.

ANISOTROPIC MATERIALS — can model orthotropic or anisotropic materials (i.e. fiber-glass, plywood, etc.). It permits elements to have different material stiffness in the local x and y directions of the element.

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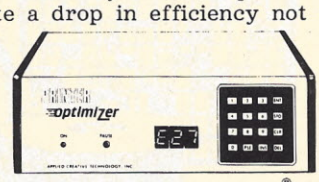
The **EASI "4+"** program is coded in baZic and requires CP/M. The baZic (included with program) is upward compatable with North Star Basic and executes programs very fast. TRS-80 computers will require CP/M.

EASI Software Inc.
2 Windsor Court
Jackson, N.J. 08527
(201) 367-5735

CIRCLE NO. 33 ON INQUIRY CARD

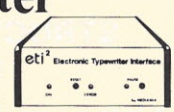
Do You Use a Printer or Modem?

The average microcomputer "moves" data at 120,000 characters a second. A typical disk drive transfers it at 27,000 CPS. Most printers however plod along at 100 CPS and many modems squeak out 30 CPS. That's quite a drop in efficiency not to mention a waste of computing power!



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```
445: INPUT "NEW NAME? ";A$(H)
450: NEXT K
   : NEXT J
   : PRINT "END OF NAMES"
   : GO TO 10
```

Subroutine

```
SUBROUTINE:  Set initial parameters.

     - Set array parameters. Note that
       I*(A+B+C)+(26-F) must not exceed the
       number of memories available with the
       program loaded.  A-1 is the number
       of type A stocks.
500: A=3
     - B-1 is the number of type B stocks.
   : B=5
     - C-1 is the number of type C stocks.
   : C=10
     - Number of periods of data. I-1 is
       the number of periods to be averaged.
   : I=4
     - Compute number of elements in a
       single period.
   : E=A+B+C
     - Number of program variables.
   : F=16
   : RETURN
999: END
```

Sample run. (use DEF mode)

```
SHIFT SPC (OPTIONS)
STOCK
A-ADD DATA
D-EDIT DATA
N-EDIT NAMES

SHIFT N (Edit Names)
(The following assumes no data has been
entered.  Prompts will be blank.)
EDIT STOCK NAMES
TYPE #1. NOW
(Use ENTER only if OK. For a change,
enter any character.)
OK? =
NEW NAME? XXXX
NOW
OK? =
NEW NAME? AA
NOW
OK? =
NEW NAME? BB
TYPE #2. NOW
(Continues per the setting of B and C to...)
END OF NAMES
```

```
SHIFT D (Edit Data)
EDIT PERIOD DATA
PERIOD TO EDIT? 1
XXXX 0.
(Use ENTER only if OK.  For a change,
enter any character.)
OK? =
NEW DATA? 30
AA 0.
OK? =
NEW DATA? 9
BB 0.
OK? =
NEW DATA? 21
(Continue for balance of period to...)
END OF PERIOD


(SHIFT D for second period.)
EDIT PERIOD DATA
PERIOD TO EDIT? 2
XXXX 0.
OK? =
NEW DATA? 31
AA 0.
OK? =
NEW DATA? 10
BB 0.
OK? =
NEW DATA? 22
(Continues to...)
END OF PERIOD

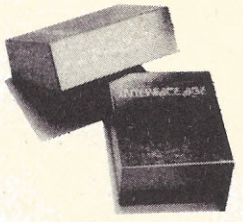

(SHIFT D for third period.)
EDIT PERIOD DATA
PERIOD TO EDIT? 3
XXXX 0.
OK? =
NEW DATA? 29
AA 0.
OK? =
NEW DATA? 11
BB 0.
OK? =
NEW DATA? 20
(Continues to...)
END OF PERIOD


SHIFT A (Add Data)
(This will be the most common mode.  Use to
enter a new period of data.  If data was
saved to tape, it must be loaded before
a run.)
ADD CURRENT DATA
XXXX
TODAY? 28
XXXX 28.
(Use ENTER only if entry was correct.  Use
any character if it was not.)
OK? ENTER
XXXX AVE=29.33
-0.67 -2.23%

AA
TODAY? 8
AA 8.
OK? ENTER
AA AVE=9.67
-0.33 -3.3%
AA -3.3% INDEX -2.23%
BB
TODAY? 22
BB 22
OK? ENTER
BB AVE=21.33
UP 0.33 1.57%
BB 1.57% INDEX -2.23%
(Continues for balance of items to...)
END OF ENTRY
```


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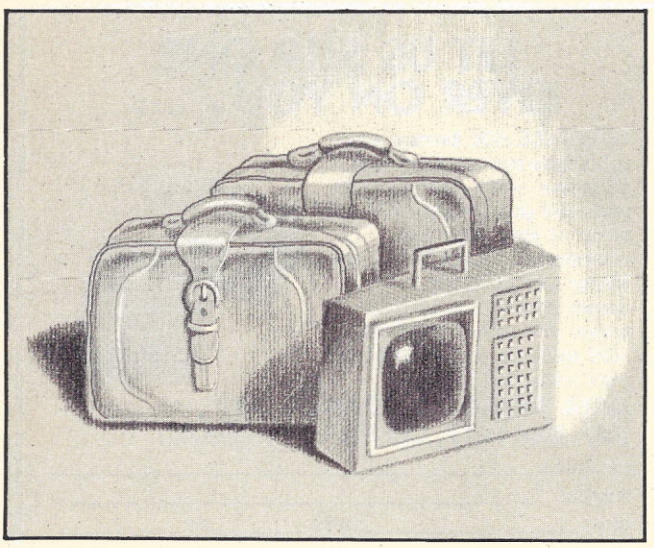
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Who Says You Can't Take It With You?

A Roundup of Portable Systems

by Gary Copeland

Consumer demand for small-scale computers is growing, and a wide variety of such products are emerging in the marketplace. Many of today's popular wares are described in this overview.



How does one define a Portable Computer? Essentially, it's a system that can be transported from one location to another with little effort. It's a computer that does not require a Ph.D. to operate—in most cases, turning the power on and sliding in a disk are all that is needed. Usually, the unit comes complete with memory systems, display, and keyboard—requiring only the addition of a printer to facilitate complete operation.

In an effort to include a formidable cross section of products, this introductory primer will offer limited descriptions of specific system characteristics. Many of these portables have been comprehensively reviewed in other issues of *IA*.

Portables can be divided into two general categories: hand-held computers (HHC) and brief case computers (BCC). As the name implies, most HHCs fit into your hand, have different types of storage inputs, come with a flat screen, and cost under a thousand dollars. BCCs on the other hand are larger in size, weight, and memory capacity. They come with a standard disk drive, display (CRT), and sell for under $10,000. The main thrust of both systems is primarily business and professional users; most are designed with the software tailored to the businessperson. These systems free the users to work virtually any place with access to a power supply.

Primary business applications are used for creating financial models, memos, and tapping into databases. This gives the users 24-hour access to stock quotes, breaking news and other information. The computers can also serve as communications devices. Traveling salesmen can process and send orders directly to the company's mainframe computer. Managers can stay in touch with a firm's electronic-mail network. Two-way access enables a salesperson to call up quotes and graphs from his company's computer to support a field presentation or allow an insurance agent to calculate premiums on the spot.

The first truly portable general-purpose microcomputer was introduced by Adam Osborne about a year and a half ago. The Osborne I, (Hayward, CA) comes standard with CP/M, 64K bytes of memory, keyboard, 5-in. screen, and two 5.25-in. disk drives for $1,795. What makes this system truly remarkable is that $1,500 worth of software is included at no additional cost to the purchaser. This put into accelerated motion the concept of including packaged software at the time of purchase of a portable—which enables the user to start computing as soon as he gets it out the door. Software available on the Osborne consists of CP/M, MailMerge, SuperCalc, and also includes MBasic and CBasic for programming.

Today, Osborne is the leader in the portable computer field with an expected $250 million in gross sales this year—making it perhaps the fastest growing computer company in the Silicon Valley. Not unexpectedly, the competition has mounted an offensive—armed with lighter, more powerful units with larger display screens.

The Otrona Attache (Boulder, CO), another BCC, weighs only 18 pounds. It comes with a standard 80-character by-24-line display. The system incorporates RS-232C, RS-422, and RS-423 communications ports, which support SYNCH, BISYNC, MONOSYNC, HDLC, SDLC and other protocols. The Attache will communicate easily with larger mainframe computers in the business environment without software modifications. Unique to the Attache in the portable computer category is its ability to handle and display full bit-mapped graphics. The 320 dot-wide, 240 dot-high

array fills the entire screen, making possible the transmission of simple drawings over the phone lines and giving a good programmer the opportunity to work with graphics on an inexpensive portable. Like the Osborne, this system also incorporates a 5-in. screen. An external monitor can be added for increased display size.

The Courier is distributed by Jonos Ltd. (Anaheim, CA). It has an STD bus that leaves empty slots for expansion memory, communications, and emulation of other computers. It comes equipped with an integrally attachable printer option that provides dot graphics, alphanumeric and double-wide characters, at 50 cps on 9½-in. wide fanfold paper. The unit measures 17-in. wide, 7-in. high, and 13-in. deep, weighs less than 20 pounds, and incorporates a (9-in.) green phosphor CRT, with a full editing terminal keyboard which has 92 keys. The larger screen enables the user to have a better view of the work being done. Priced around $4,000, the Courier is a commendable system considering weight and expandibility. The system incorporates the Sony 3.5-in. disk drives, which make acquisition of software outside the vender a problem at the present time.

The Kaypro II from Non Linear Systems (Solana Beach, CA) is a multi-purpose computer with a 9-in. green display showing 80 columns and 24 lines of upper/lower case characters. Priced the same as the Osborne I, the Kaypro has the advantage of a 9-in. screen and double-sided, double-density drives, but the trade-off is an extra five pounds in weight. Compared to the Osborne, some sacrifices are also evident in the software selection.

The Hyperion, a product of Dynologic (Ottawa, Canada), features an Intel 8088 16-bit processor, (the same is being used in the IBM), 256K bytes user RAM, 5.25-in. dual-sided disk drive, and a detachable keyboard that can be used up to four feet away from the main unit. The advantages of this system are its 7-in. CRT with amber phosphor, built-in 300-baud modem, a time/date clock with a battery back-up. Primarily designed to emulate the IBM PC in software capabilities, the Hyperion would make an excellent addition to a business already dependent on the IBM PC, but also needing a portable for mobile executives.

Still relatively bulky, the BCC category is definitely moving in the direction of creating a market rivaling the stand-alone and personal computers. HHCs have less memory and a much smaller screen, but in certain applications can be very useful computers. Most come with a one-line flat screen display. Several technologies exist for building flat-screen displays, but the two that currently dominate the field are Liquid-Crystal Displays (LCDs) and electroluminescent displays. LCDs are effective because of their low power consumption. They don't emit light but prevent it from being reflected. The Grid Compass (to be described later) is currently the sole example of a computer endowed with an electroluminescent display.

Most HHCs are like calculators in appearance but much more powerful in their scope. A majority of them come from Japan; including the Sharp 1500, the Panasonic/Quasar, and the Epson HX-20. Hewlett-Packard recently introduced the HP-75C (see review in this issue), a HHC compatible with its present product line. The new HP-75C—nicknamed the "Kangaroo"—is 10-in. by 5-in. by 1.25-in., and has the ability to run for about 30 hours on its rechargable nickel-cadmium batteries. The ROM-based operating system features 169 instructions, of which 147 are Basic commands and statements or functions. Comprehensive plug-in software packs in the form of ROM modules are provided for specific applications. Independent software suppliers will inevitably help develop and market software for the new HP-75C portable computer, but existing software is limited.

Radio Shack calls its new HHC the PC-2, which is actually the Sharp 1500. Regardless of the label, the unit is a notable refinement of its predecessor, the PC-1. It offers greater speed, more memory, and an enhanced Basic, but still does not have much software available for it. Unfortunately, this is a problem with many HHCs. The systems are not designed for application programmers. Few third party software houses are going to support a system requiring equipment to develop software. This leaves the entrepreneur out in the cold and the manufacturers with the problem of developing most of the application programs.

Another major problem with the HHC is the undersize keyboard. Have you ever tried to enter a large amount of information on your calculator without making a minor mistake? Now imagine trying to write a business letter on an HHC. Some of the marketing claims are a bit overstated. For instance, I wrote this article on a word processor that requires about 48K bytes of memory, and in the brochure for the Panasonic/Quasar HHC, there is a picture of a reporter entering information into his computer. The caption reads, "Members of the press or related industries can use the Link as a portable mini word processor." A text editor needs a minimum of 16K and the Matsushita Link only has 8K. I just don't see the HHC being used for these types of applications.

Handheld microcomputers are not well-suited to word processing applications . . .

Actually, there are some very good applications for the HHC—like communicating with a mainframe computer from a remote location, collecting a limited amount of information for use at a more convenient time, and storing large algorithms for field applications by engineers or number-oriented businesspersons.

Two systems that are hard to place categorically are the Teleram. T-3000 and the Epson HX-20. Both come with a full typewriter-like keyboard and a unique 4 line LCD. The Teleram has a full 80 character display, which tilts for better visibility, 64K to 256K built-in bubble-memory (this emulates Drive A in the CP/M operating system), Z80 processor, standard keyboard with 16 function keys, numeric keypad, and operates for about five hours on rechargeable long life batteries. Programs and data have to be entered by an external memory source through its built-in RS232-C interface, either by disk drives or over the phone lines. The Epson HX-20 comes with micro cassette, 16K, RS232 interface, and a tiny printer much like the ones found on calculators. Under $800, this would be a useful system for a student entering college with a fixed income, but since the HX-20 does not have a standard operating system, software is limited to the operator or dealer. As a front-end for a computer, this system would be far better than the HCC,

because of its full-function, full-size keyboard. Unfortunately, communication capabilities are presently limited on the HX-20.

One of the most innovative systems that doesn't really fit any current category either is the Grid Compass (Mountain View, CA). It is aimed directly at high-end Fortune 1000 business executives who need instant access to their company's information. The Compass has a 1-in. thick flat display screen and a built-in nonvolatile magnetic bubble-memory that can store up to 256,000 characters of data after the power has been turned off. That's slightly less than what fits on a double-sided 5.25-in. floppy disk. Grid is a completely "closed" system in the sense that the computers will be sold and serviced directly by the manufacturer. Software is unique to the Compass and is incompatible with any other computer system. It comes in a magnesium case and the flat screen flips up to reveal the 57-key keyboard and a separate cursor pad. The screen displays 24 lines of characters vertically and 52 characters horizontally. It can also display up to 70 proportionally spaced characters horizontally, 16 characters at a time, allowing you to see a 256-column-wide spreadsheet.

Sales of portable microcomputers are predicted to grow to more than $4.8 billion by 1987...

The system is powered by a 16-bit microprocessor and comes with Basic, Fortran, Pascal, PL/M, and C programming languages. It emulates an IBM terminal, giving it communication capabilities with mainframe computers. Grid has done something very unique—offering programs that are completely compatible with each other (spreadsheet, plotting programs, databases, and others). Once the information is stored in one program, it can be accessed by any of the other programs, thus saving valuable time by not duplicating information input.

Industry observers are predicting that sales of portable and hand-held computers will grow from $185 million last year to more than $4.8 billion by 1987. Tomorrow's systems will probably represent a cross in technology for example, abandoning the CRT in favor of the flat screen. Prices will continue to drop as technology continues to expand. With larger memories, systems will be able to incorporate other higher level languages for more comprehensive programming—this will in turn increase the usefulness of the portable. □

Gary Copeland has a degree in Computer Science. He has worked as a consultant for Rockwell, McDonnell Douglas, and others in the Aerospace Industry. His expertise is in system design and analysis.

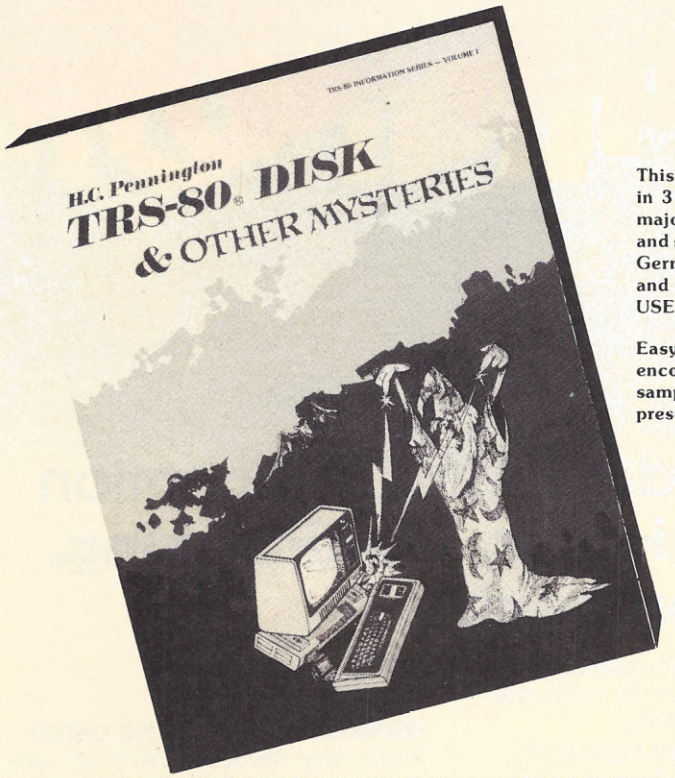
Comparison of Some Sample Portable Systems

Manufacturer	Model	Weight	Screen	Memory	Software	Price	Notes
Otrona 2500 Central Ave. Boulder, CO 80301	Attache	19.5 lbs.	5-in. Green CRT	64K	CP/M business packages	$3,995	Graphics Capability
Jonos, Ltd. 920-C E. Orangethorpe Anaheim, CA 92801	Courier	19.5 lbs.	9-in. B&W CRT	64K	CP/M business packages	$3,995	STD Bus Structure
Digital Microsystems 1840 Emborcadero Oakland, CA 94606	DMS-3/F	30 lbs.	9-in. B&W CRT	64K	*	$3,995	–
Grid Systems 2535 Garcia Ave. Mt. View, CA 94043	Grid Compass	9.2 lbs.	electroluminescent flat screen 70 by 24	256K	CCPS business packages	over $9,000	Graphics Modem and IBM Emulation
Hewlett-Packard 1000 NE Circle BL. Corvallis, OR 97330	HP-75C	26 oz.	32 Character LCD	16K	ROM packets	$995	Handheld Computer (HHC)
Epson 3415 Kashiway St. Torrance, CA 90505	HX-20	3 lbs. 13 oz.	4 Line 20 character LCD	16K	ROM packets	$759	HHC
Dynalogic 141 Bentley Ave. Ottawa, Canada K2E6P7	Hyperion	20 lbs.	7-in. green CRT	256K	MS DOS business packages	$4,500	IBM PC Plug Compatible
Non-Linear Systems 533 Stevens Ave. Solana Beach, CA 92075	Kaypro II	26 lbs.	9-in. B&W CRT	64K	CP/M business packages	$1,795	–
Matsushita 1 Panasonic Way Secaucus, NJ 07094	Panasonic/ Quasar	1 lb. 6 oz.	26 character LCD	8K	Basic On ROM Packets	$480	12 hour battery; HHC
Micro Source Inc. P.O. Box 319 New Lebanon, OH 45345	M 6000 P	*	9-in green CRT	64K	CP/M	$3,900	–
Osborne Computer 26500 Corporate Ave. Hayward, CA 94545	Osborne I	24 lbs.	5-in. B&W CRT	64K	CP/M business packages	$1,795	Industry leader
Radio Shack One Tandy Center Fort Worth, TX 76102	PC-2	28 oz.	26 character LCD	2K	No software available	$280	HHC
SMC Computer Corp. 3780 Green Industrial Way Atlanta, GA 30341	CompuCase	*	40 by 12 Plasma	64K	CP/M	$7,995	Sold in large quantities
Teleram 2 Corporate Park Dr. White Plains, NY 10604	T-3000	Under 10 lbs.	4 Line 80 character LCD	64K	CP/M	$2,995	Cross between BBC & HHC

*Information Not Available

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This valuable textbook, the first in a series by H. C. Pennington, has been reviewed in 3 major magazines and has been the topic of extensive conversation on two major computer communications networks. Presently, the book is being distributed and sold throughout the United States, Canada, the Union of South Africa, England, Germany, Australia, the Netherlands & others. William Barden, Jr., a well known and widely published computer author comments, ". . . my advice is to get it and USE it!"

Easy to read, entertaining material covers nearly every aspect of the many problems encountered on the TRS-80 system with disk storage. Actual examples, problem samples, memory maps, "how to fix . . ." solutions and countless illustrations are presented throughout.

Author: H. C. Pennington Publisher: IJG Computer Services
First Edition - Second Printing - Soft Cover - 130 Page
8½" x 11 — Wt. 1 lb. — Retail price: $22.50

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MURPHY'S LAW AND OTHER COROLLARIES
ORDERING NEWDOS AND SUPERZAP
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DISK MAP (TRSDOS 2.2) • DIRECTORY MAP • GAT SECTOR MAP
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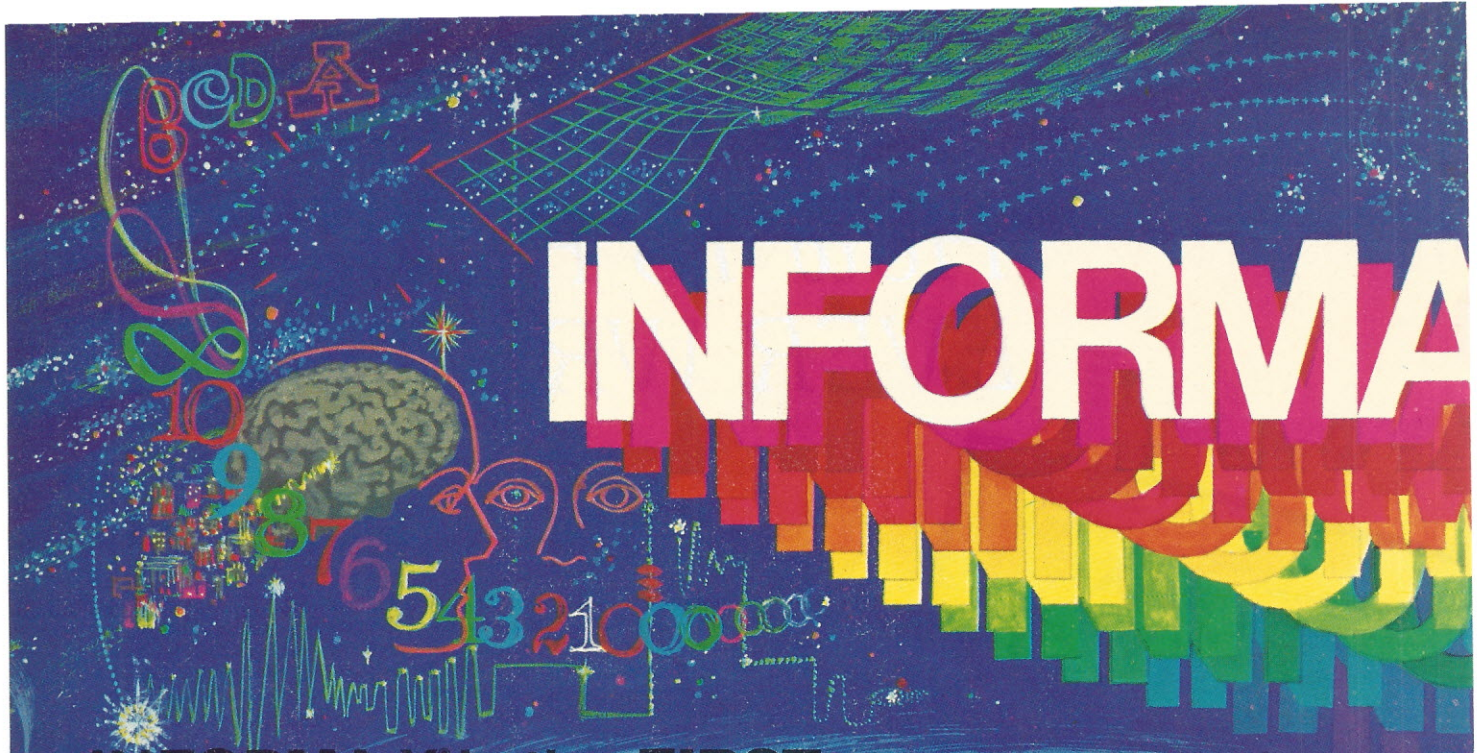
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like: B:XPNW = MAIL

No "English type commands"
like: Find record 5 on drive D:
in database mail

No "Cryptic Commands"
like: pip d:=c:*.??v

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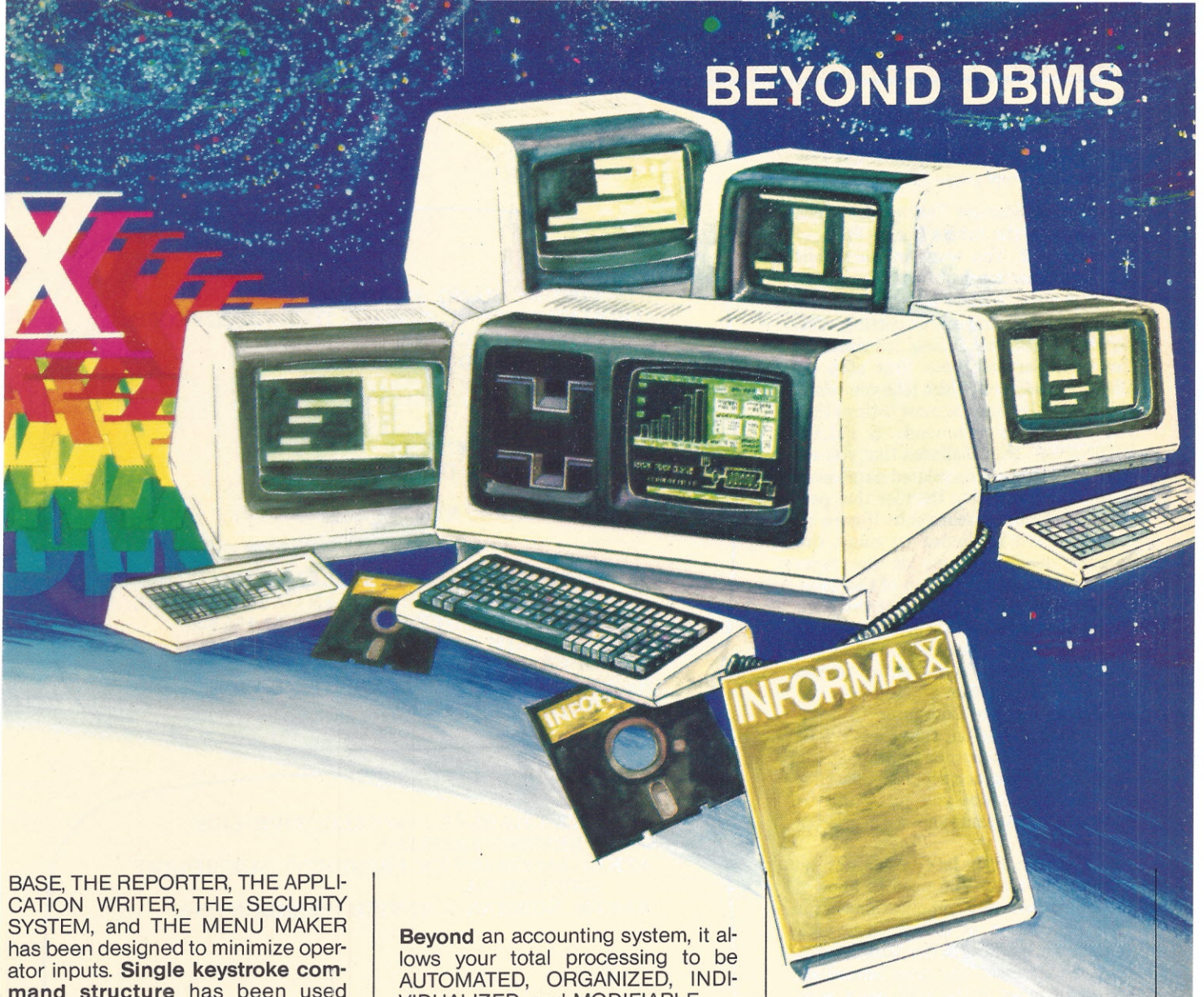


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forecast of Storage Technology's performance in the future (figure 3).

Scenario 2: You work in the public relations department of Apple Computer, and you want to know how much media coverage your company is getting. You decide to use the Dialog Information Retrieval Service. Your first stop on Dialog is Dialindex, which tells you which of Dialog's files has the most listings that you want. The command "S FILES BUSNEWS" tells Dialindex that you are interested in business-related databases. It responds by listing the files that pertain to business publications (figure 4). You then tell Dialindex to count the number of occurrences of the term "Apple Computer" in each of the databases (figure 5). You learn that there are 46 listings referring to Apple Computer in the magazine Index and 113 in the newspaper index. You transfer to the Magazine index, file 47, and ask for articles on Apple Computer in 1982 (figure 6). You find out that there are 16 such articles. Rather than printing all the records, you request a bibliographic citation for each, since you just want to know which magazines have run articles (figure 7).

Scenario 3: It is late in the day on August 30, 1982. You need to know if there have been any complications in the PLO evacuation of Beirut since your company has offices in the Mideast that could be affected. The most immediate source of news is the UPI news wire, available on The Source. You enter the keywords "Lebanon" and "evacuation" and find there have been 16 stories filed today on this subject. You decide to scan the first new lines of each story in reverse chronological order to find the most relevant and timely report (figure 8). You select a story that was filed at 9:30 P.M. Eastern time and have it output on your printer (figure 9).

A Look to the Future

After sampling different information services, one cannot help feeling like a child who's allowed to spend 15 minutes at an amusement park. There's a deep sense of fascination, but a definite yearning for more. Realistically, there are several technological, economic and societal changes that must take place before we'll know we're really living in the information era.

The speed and capacity of information retrieval and storage will have to improve. Users will want to retrieve the full text of the articles they're accessing, and they'll want to have it sent to their terminal at much higher speeds. The ability to send graphics —of sufficient quality to display photographs—will be absolutely necessary before periodical readers will consider viewing their favorite magazine on a CRT.

Cost of the services will have to come down. At present, the expense of connect charges is keeping many potential users away—which is exactly what the industry doesn't want to have happen if the field is going to thrive. Knowing that the meter is running each minute they're online can make users feel rushed. This contrasts with the leisurely manner of reading they're used to at the library or at home. An alternative pricing scheme might charge users by the unit of information retrieved, and not connect time.

Of course, charges for information re-

```
12

DISCLOSURE CO NO: S789075000
COMPANY NAME:     STORAGE TECHNOLOGY CORP
CROSS REFERENCE: NA
ADDRESS: 2270 SOUTH 88TH STREET
LOUISVILLE
CO
80027
TELEPHONE: 303-673-5151
INCORPORATION: DE
EXCHANGE: NYS
TICKER SYMBOL: STK


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     CHIEF EXECUTIVE OFFICER/$1,135,850
AWEIDA, NAIM S./53/PRESIDENT, CHIEF
     OPERATING OFFICER/$1,640,268
HERGER, ZOLTAN L./51/EXECUTIVE VICE
     PRESIDENT/$338,093

SIEFERT, CHARLES J./50/EXECUTIVE VICE
     PRESIDENT/$579,280
ATKIN, JACOB/48/VICE PRESIDENT, SUBSIDIARY
     OFFICER/NA
BARTH, NORMAN B./47/VICE PRESIDENT/NA


3

   INCOME STATEMENT
 FISCAL YEAR
 ENDING:            12/25/81     12/26/80     12/28/79
NET SALES        921,963,000  603,493,000  479,453,000
COST OF GOODS    590,459,000  393,104,000  305,848,000
GROSS PROFIT     331,504,000  210,389,000  173,605,000
R & D
EXPENDITURES      53,687,000   39,274,000   33,055,000
SELL GEN &
ADMIN EXP        113,570,000   69,540,000   54,660,000
INC BEF DEP &
AMORT            164,247,000  101,575,000   85,890,000
```

Figure 2. Detailed company information from Dow Jones

trieval are not likely to drop significantly until there are more users. This won't happen until consumers are convinced of the reliability, usefulness and cost-effectiveness of computer-based fact finding.

The industry must also have the support of the providers, as well as the users, of information. Journalists, researchers, statisticians and programmers should be encouraged to contribute to the growing store of on-line information, and compensated fairly for their effort. The dependence on workers who abstract information from the jungle of print publications for computer digestion has spawned a new breed of professional. Indeed, such employees at Predicasts, Inc., a Cleveland-based information provider, are currently seeking to unionize with the Newspaper Guild.

Knowing that the meter is running each minute they're online can make users feel rushed.

In all likelihood, the concept of information as property will grow in the years ahead, as more people become willing to pay to use it. Already, some network operators pay royalties to the information suppliers based on the amount of connect time. If, as some have predicted, information becomes the commodity of the eighties, the legal and governmental issues will grow in complexity.

However society ultimately decides to deal with the implications of information retrieval, we see now that the effects will be widespread. It may well turn out that the four services we have examined here will become recognized as society's entry point to the information era. □

Jim Cavuoto is a science writer, residing in Redondo Beach, CA. He has written articles for several computer, medical and aerospace industry publications, as well as general-interest science magazines. He received his engineering degree from Case Western Reserve University, where he studied biomedical engineering and psychology. He has also done graduate study in human factors engineering at the University of Southern California.

```
STORAGE TECHNOL
--FISCAL YEAR ENDS      12/83

EARNINGS PER SHARE ESTIMATES
--MEAN      3.29
--HIGH      4.18
--LOW       2.40
NUMBER OF ANALYSTS      10
P/E RATIO (ESTIMATED EPS)      5.20

PAST EARN PR SH ESTIMATES (MEAN)
--WEEK AGO      3.29
--13 WEEKS AGO      4.05
--26 WEEKS AGO      4.39
```

Figure 3. *Dow Jones projection of future earnings*

```
S FILES BUSNEWS

File17:PTS PREDALERT - Aug23
File47:Magazine Index - 77-82/Aug
File111:National Newspaper Index - 79-82/Aug
File132:Standard & Poors News - 79-82/Wk35
File133:Standard and Poors Daily News
File148:Trade and Industry Index - 81-82/Aug
File211:NEWSEARCH

      File Items Description
```

Figure 4. *Dialog listing of business publications*

Other figures on page 184

```
? SELECT APPLE(W)COMPUTER
(17) 21 APPLE(W)COMPUTER
(47) 46 APPLE(W)COMPUTER
(111) 113 APPLE(W)COMPUTER
(132) 51 APPLE(W)COMPUTER
(133) 0 APPLE(W)COMPUTER
(148) 139 APPLE(W)COMPUTER
(211) 15 APPLE(W)COMPUTER
```

Figure 5. Dialog references to Apple Computer

```
? B47

      31aug82 2:56:56 User28569
$5.67 0.162 Hrs File411 38 Descriptors
$1.30 Tymnet
$6.97 Estimated Total Cost

File47:Magazine Index - 77-82/Aug
(Copr. IAC)
      Set Items Description

? S APPLE(W)COMPUTER

        1       46 APPLE(W)COMPUTER

? S PY=1982

        2 74253 PY=1982

? C 1 AND 2

        3 16 1 and 2
```

Figure 6. Yearly references to Apple on Dialog

```
? T7/3/1-16

7/3/1
0663011     DATABASE: MI File 47
Revenge of the nerds. (Apple computer cofounder
      Stephen Wozniak's biography)
Ciotti, Paul
California Magazine v7  p72(11)  July 1982
illustration; photograph

7/3/2
0654434     DATABASE: MI File 47
Apple plants the seeds; if the Technology Education Act
      passes, Apple wants to donate between $200 and
      $300 million worth of its machines to schools.
Schatz, Willie
Datamation v28  p66(4)  June 1982
CODEN: DTMNA
```

Figure 7. Dialog bibliographic references

```
16-30-82 10:50 ped

DAMASCUS, Syria (UPI) - A high-ranking guerrilla
leader of the Popular Front for the Liberation of
Palestine said Monday the thousands of Palestinian
fighters scattered across the Arab world will soon be
reunited.
```

Figure 8. Source news update

```
15-30-82 09:30 ped

(12grafld; picksup12thgraf: syrians join forces in bekaa;
pullout may end 3 days early)
  By VINCENT J. SCHODOLSKI
United Press International
    Clutching an olive branch, Palestine Liberation
Organization chairman Yasser Arafat sailed from Beirut
Monday for Greece but defiantly vowed his scattered army
never will end its "long march" toward creation of a
Palestinian state. (complete story follows)
```

Figure 9. Complete news story on The Source

Computer Installation Blues
Continued from page 144

of your computer and should not be viewed as "wasted overhead." The parallel approach is particularly necessary in accounting applications to prove that the computer comes up with the same figures as the manual process. If it doesn't, this may point up a serious error.

Finally, the process of going from the old way to the computer must be planned, executed and monitored. Again, this is not an elaborate procedure but should be carefully considered. Are you going to convert to the new accounting system during a quarter? If so, how will you merge the figures from the two systems for the quarterly report to the home office? Will you have to pay overtime to have your customer data loaded into the system, or can it be done during slow periods in the office? The switchover can be a smooth process—but only if it is carefully scheduled so as not to disrupt your daily routines.

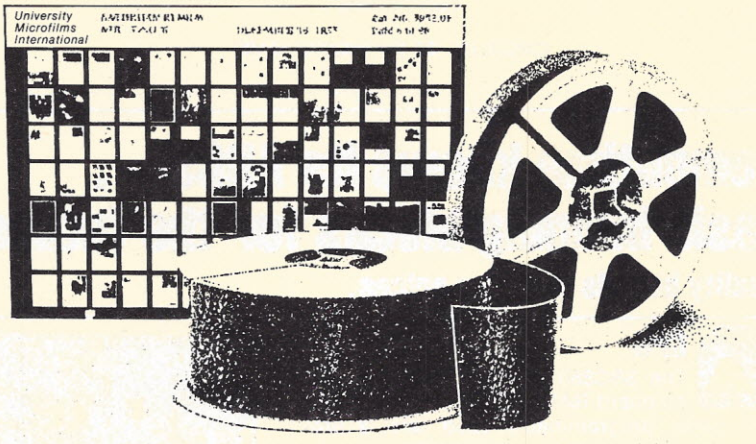
Deliberately plan for growth

Don't install a system that has no room for expansion. If you have made the right choice, shortly after the initial installation you will start to use the system for things that weren't even considered when you bought the computer. Even if the first application was "just" a mailing list, you will probably find that you can maintain at least double the number of entries that you could manually. In addition, you might start keeping a mailing list of suppliers as well as customers. The success of the mailing lists will pave the way for other applications in the financial area as well as word processing. It would be a shame to terminate this expansion because of limited computer resources (RAM, disk space, or software). This doesn't mean that the orginal system must be the biggest offered, but it must be expandable, or you must be prepared to go to multiple systems.

The key word in a successful computer office installation is *pre-planning*. Set your goals, determine your needs and follow a definite itinerary. It won't take long for you and your employees to see that the hours invested in preparation are paid back hundreds of times over again in increased work efficiency.□

Reginald Gates supervises a group of system analysists at McDonnel Douglas Automation Company, where he has worked for more than a decade. He has considerable programming experience on many types of hardware, and has written articles for several industry publications.

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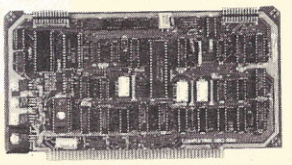
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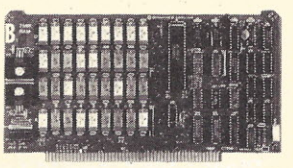
A CPU

The SBC880 features 4MHz Z80, 1K on-board RAM, RS232 I/O port, 2 parallel ports, programmable baud rate, 2 programmable interval timers. 2K EPROM.
A/T $325, kit $295, BB $45.



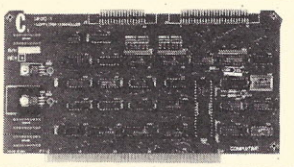
B DYNAMIC RAM - 64/256K

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Peripheral Potpourri
Continued from page 104

kit had worked; it does seem like a handy solution to the friction feed problem.

Ramcram for Atari

Axlon Inc. (Sunnyvale, CA), which manufactures the innovative Ramdisk, a 128K memory extension for the Atari 800 system, now offers a modification to its 32K Ramcram. The modification allows the Ramcram card to be used together with the Ramdisk, which was not possible before. With the new card, Atari users need only the 32K dynamic memory and the Ramdisk to have a full 48K-byte RAM address space in normal operation, and the 128K electronic disk is ready when required.

Installing and using the Ramcram is exceptionally easy. Install it in the first RAM slot, the Ramdisk goes in the second slot. At this point, the computer may be turned on and placed in service—that's all there is to it. The card is well-made; gold-plated edge connectors are used for reliability, and all integrated circuits are socketed—not just the memory chips. The card is surrounded by two plastic sheaths to simulate a normal Atari card, making insertion more certain and styling compatible with the Ramdisk. The Ramcram operates reliability and produces no on-screen interference, making it an ideal choice to upgrade Atari computers for additional memory capability and compatibility with the electronic disk.

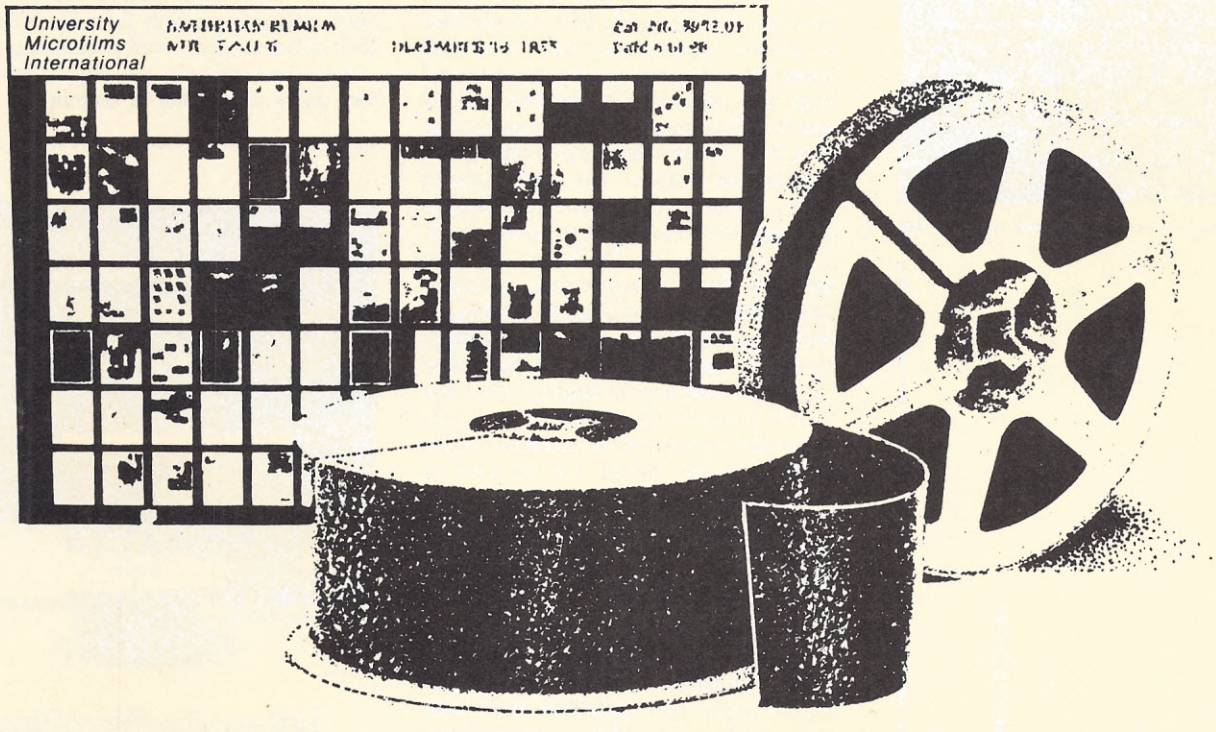
The Ramcram card may also be used in the Atari 400 computer, but the plastic covers must be removed first. This is a simple operation, requiring only a Phillips head screwdriver and the removal of the label tape from one side of the module. After this operation, the Atari 400 must be opened, and full instructions are provided for this operation. Axlon provides the standard caveat that the company is not liable for any invalidation of the warranty that may result from error of installation. I certainly would not let this deter me from adding this card to my 400, as the additional memory is certainly worth it. □

Contributing editor Roger H. Edelson's experience in the electronics industry has included analog circuitry, analog computation, digital design and, most recently, design and development in the field of microwave communication circuitry. He has been with Hughes Aircraft for more than 20 years, during which time he has been Group Head of the Memory Circuits Group, and Senior Project Engineer with responsibility for the technical and financial development of the F-14 Computer Subsystem.

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Pie Writer
Continued from page 95

example, you can turn off its wraparound capability. You can shift blocks of text left and right on the page. You can make "literal" entries—such as printer control characters or ASCII codes not available on the Apple keyboard—that Pie Writer will maintain and send to the printer but will not try to interpret.

Pie Writer gives you two sets of load and save commands, one for binary files, one for text files. You can even load in data as text and save it again as binary, or vice versa.

The Pie Aux file contains the code for additional commands. To access these, the program disk must be loaded in the slot and drive you specified as a configuration parameter. That's where Pie Writer goes looking for the file when you begin a command with the "%" key. With Pie Aux on line, Pie Writer can display the space remaining on a diskette, count words and lines in a text file, save and load tab settings, verify files, convert files to inverse capitals and back to normal upper/lower display, and trigger start and stop of a separate Doubletime printer spooler. The documentation makes clear that Pie Writer "does not support the Doubletime Printer" but allows you to start, pause, and resume Doubletime printing from within the program itself.

You can also use Pie Writer for rudimentary data transmission, although you cannot see what you are sending or receiving. To do this, you would simply establish the connection to the other computer, and key in appropriate commands to cause Pie Writer to send text to the slot number of the modem. On the other end, Pie Writer can be used to receive data and later store it on a disk.

Pie Writer's documentation is essentially the same as in previous releases of this program: thorough, detailed, and more complete than what you may be used to. Chapter by chapter, the looseleaf pages in its padded stand-up binder cover each aspect of installing, configuring and using the capabilities of the software. With a large table of contents and a detailed index to program capabilities, you should have an easy time referring to the information you want. If there is any fault, it is the volume and depth of this information. It may be years before you fully understand every aspect of Pie Writer and its capabilities.

General observations

The biggest problem with this program seems to be the excessive number of keystrokes required to make it do its tricks. It's not unusual to press 5, 7, even 10 keys before a command sequence is complete.

One reason is the program's extreme flexibility. Nearly every command takes an optional modifier. For example, <ESC Control-Shift N> will delete a line of text. But you can include in that command the line numbers of a range of text, and the computer will delete them all. A "$" in place of one of the line numbers will delete lines to the end of the file.

In practice, there is a lot to think about to use the capabilities Pie Writer makes available to you. For example, suppose you want to delete 10 consecutive lines. You can delete them individually. Or you can plan ahead, determine their line numbers, and delete them as a group. But make sure you don't give the wrong line number and delete a line you want to save. And what if the lines are not quite consecutive? And what if you want to delete only part of the lines at the head and tail of the section?

There are other problems—less important—stemming mainly from Pie Writer's lack of some basic word processing capability. For example, you cannot look at two parts of the file in memory at the

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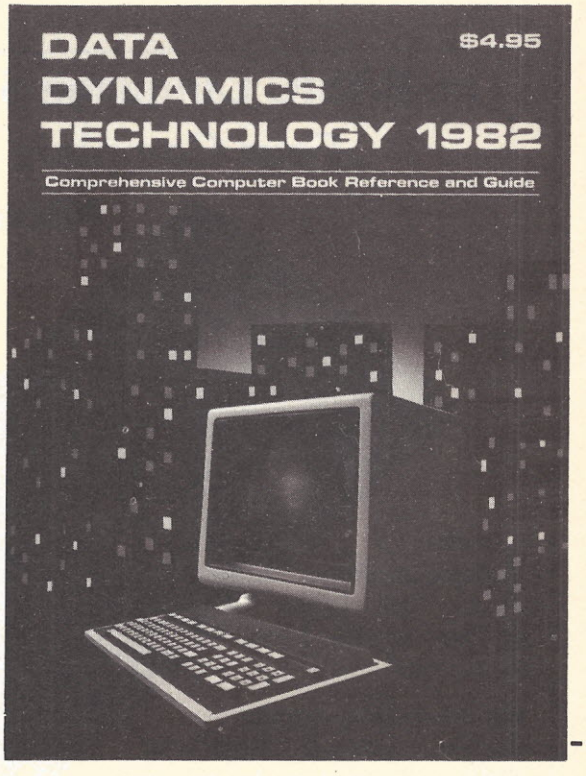
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same time. I find this invaluable for holding my main place while I do some minor work on the file, for referring to other material, for fleshing out an outline, and for comparing two text files for differences and similarities.

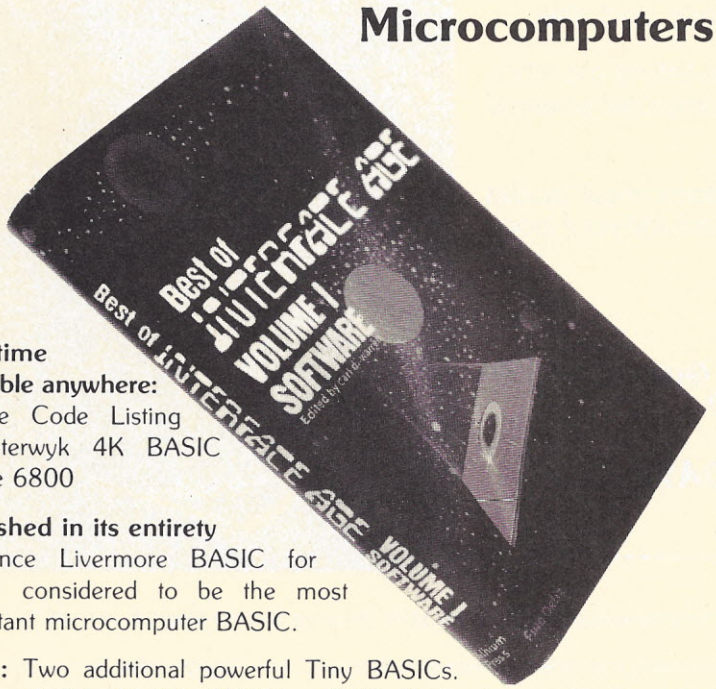
Another deficiency is in the search capability. Since Pie Writer is more line-oriented than a true word processor, it gets fooled if the string you want to find spills over from one line to the next. You won't find a string unless it is fully contained on a single line. Also, there is no optional replacement mode. Some word processors allow you to key "Y" or "N" to replace or pass an occurrence of the search string. Here you must replace each occurrence manually—all of them, or a specified number of them in a row.

Pie Writer can handle all these situations. You can even specify lines for an operation by using actual cursor movement in place of keying in line numbers. But whatever you do, and however you do it, you have to think about every keystroke—particularly if your text is very important to you. There is even more complexity because various command strokes work in slightly different ways, depending on the current status and operating mode of the system. For example, the tabbing feature works differently depending on the entry mode you are using. In addition, there is some redundancy in the program. For example, you can cause the program to print an inside address to a letter—short lines printed flush on the left margin—with at least two different sets of commands. There are often several different ways to activate a single simple function. As a result, you may spend quite some time working with Pie Writer before the more complicated—and less frequently used—command sequences become safely second nature.

Pie Writer handles undemanding applications with ease, but is more difficult when used to its fullest capacity. For example, a three-key command can bring you a Help screen, with a display of all Pie Writer's simple functions and the keystrokes required to implement them—but more complicated functions do not provide such easy access. It is definitely a valuable program, but not for the person who wants it exclusively for word processing. The program is much more suitable for the knowledgeable Apple user who wants a variety of capabilities in a single system and is willing to make the time and learning investment to obtain reliable results for complex applications. This new version has more bells and whistles, a little more order, some nicer packaging features, and a solid price increase. Little has been lost and much has been gained in this update to a time-tested classic. □

Contributing editor Robert Moskowitz is a full-time management consultant and business writer. He has authored management programs and produced industrial training films. He wrote How to Organize your Work and Your Life *(Doubleday) and has contributed to numerous publications. He is currently Editor-in-Chief of* Executive Productivity and Office Technology Management *and recently developed the computerized Personal Productivity Audit system.*

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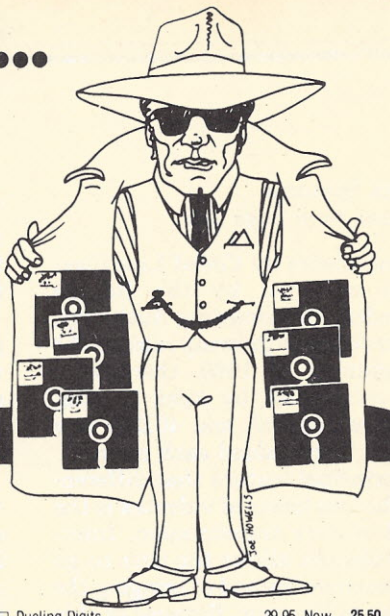
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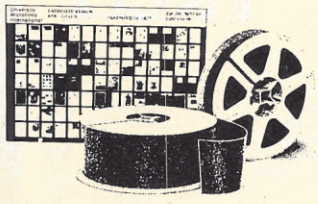
Videotex Systems
Continued from page 118

Announcements by Coded Line Electronics) operated by the British Independent Broadcasting Authority. Both services are growing rapidly. At the beginning of 1980, there were 40,000 sets in use, by April 1, 1982, there were 450,000, and 40,000 new sets were being added each month.

The principal feature that differentiates the two forms of videotex is the method of data transmission. Interactive videotex allows the user to go to the database instead of bringing the database to the user. Because of this very fundamental difference in operation, each approach has several advantages unique to it.

Interactive videotex can provide an immediate response to requests for information. Furthermore, it can buttress what it provides with an in-depth treatment of a subject limited only by the volume of information stored in the database about the subject and the time it takes to read it.

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The two-way capability of the system also makes applications available to the user, such as electronic mail and full-service teleshopping.

From the service provider's standpoint, the ability to require user passwords makes it practical to selectively develop databases for special interest groups and to bill each user for the amount of service used.

Broadcast videotex will satisfy those who want relatively small quantities of frequently-changing information such as news, weather and sports results. The cost of obtaining information will be nominal or perhaps free if the service is part of the regular station broadcasting. Receiving the signal over the air has the added advantage of not tying up a phone line or requiring a second phone line dedicated to videotex reception.

Since the service is broadcast, ten—or ten million—people can access the system without requiring any additional equipment at the broadcast end. There is no congestion created by too many people trying to dial up the database, nor is there a need for an expensive decoder containing a modem at the user's end. In theory, an inexpensive microcomputer could serve the entire world, in contrast to the handful of people who can simultaneously access a database interactively.

Because of the relative advantages possessed by each form of videotex, interactive and broadcast videotex should be regarded as complimentary rather than mutually exclusive. Applications that can be broadcast economically will be received via teletext and applications that require a two-way exchange will be handled by interactive videotex. This basic principle is reflected in the integrated decoders used in Great Britain. With both interactive and broadcast modes available, the full scope of the following applications will be available.

Frames in the database may be accessed one of three ways. The first involves starting with the main index page (figure 4) and entering sequentially the prompt numbers on each index page. This is often referred to as treeing and may take considerable time to perform. The second method involves entering the specific number of the page desired. In order to know the correct number to use, either a paper directory must be issued or an alphabetical index must be stored on the system. The last approach is a keyword type of search with an alphanumeric keyboard.

Goods and services may be ordered from merchandise catalogues or from advertisements contained in the database. Figure 5 is an example of the types of response pages available on Prestel.

A limited messaging capability exists in Prestel. Electronic mail is viewed as very important by system designers throughout the world and future generations of videotex will undoubtedly allow terminal-to-terminal capability.

A two-way capability makes it possible to use videotex as a device for polling subscribers regarding questions about the effectiveness of advertising campaigns, their reaction to political speeches, public response to major news stories and so forth. In systems with storage available to subscribers either at the terminal or computer end of the network, personal data such as mailing lists, activity calendars, personal notes and data may be stored.

Home and business terminals may be used as microcomputers if sufficient capability is included within the hardware. User-entered parameters may be processed by software located at the host computer and the results of the computation returned to the user, or software may be downloaded upon request to the user's site for execution. The name given to computer programs transferred in this manner is telesoftware.

As the preceding applications indicate, videotex is more than a system for simply displaying information. Some of the most exciting areas under development are collectivley referred to as teleservices. These are activities related to controlling, metering, and monitoring events at the subscriber's site. Telecontrol enables a utility company to make adjustments to environmental controls for heating and cooling buildings. Another application called telemetering permits remote meter reading for billing purposes and telemonitoring allows police and fire units to monitor for intrusion and fire. Teleservicing has the potential of eliminating some of the human effort needed to provide basic services and will result in resource conservation, while at the same time improving the quality of life for subscribers.

Videotex's impact on DP

People well-versed in data processing regard videotex as a relatively unsophisticated application of computer technology using tools and techniques that have been available to the data processing specialist for years. They are correct!

The revolutionary feature of videotex is that it makes computer power and computerized databases available to the nontechnical person at home and at work. It provides the infra-structure for the often discussed—but never before attainable—wired society in which transactions of many kinds can be handled electronically, regardless of whether they originate at home or work. In so doing, it integrates the computer and all of its power into the basic fabric of society. There are three key characteristics that videotex possesses making this possible: simplicity of use, economic competitiveness, and the ability to share databases.

Videotex is user-friendly. The most popular terminal is a modified TV set with a simple keypad containing twelve or more buttons. Gaining access to the computer is very simple and involves turning the set on and pushing a button to automatically dial the computer center in the case of interactive videotex. For broadcast videotex, the set is simply turned on.

If the number of a page being sought is known, it can be accessed directly by entering the correct number. Otherwise, information is presented in a tree format. A main index is displayed, which leads to additional index pages until the desired page is found. No previous computer experience or training is necessary.

The text is displayed in 40 character lines with usually either 20 or 24 lines to a page. Upper and lower case text, double height characters and extra large fonts are standard. Graphics may be combined with text in eight colors (red, blue, green, cyan, magenta, yellow, white, black) on many systems along with flashing to highlight parts of the display. Display resolution varies tremendously among systems, but the capability does exist to transmit photographs along with text in several trials.

The sets are relatively expensive today, often costing as much as $2,000. However, prices are falling rapidly and estimates are that within the next few years, modified television sets will be available for $100 to $300 over the price of a standard television without videotex capability.

Because of the scarcity of commercial services, the pricing mechanism for selling a videotex service is not well-developed. However, some combination of a monthly subscription charge, a charge for the length of connect time, and perhaps a cost per page are likely. (The latter two relate to accessing an interactive system.)

For business users, no large capital investment is required, especially if a public service such as Prestel is used. The relatively simple and standardized format allows new applications to be implemented rapidly and no software development is necessary. Instead, the major task is to properly design the database for easy access and rapid updating. From the data processing department's point-of-view, interactive videotex can provide an especially cost-effective way to collect data and present information produced by the mainframe.

The ability of a data processing department to collect and disseminate data can be expanded considerably through the use of gateways. A gateway permits access to outside databases and is a key feature of the German Bundespost service and was implemented this year on Prestel. In addition to serving as a bridge to other databases, a gateway provides the mechanisms for interconnecting heterogeneous systems—a problem confronting many organizations today.

Videotex is a major new application of data processing technology. In both its broadcast and interactive forms, it will provide services that have been discussed for years—but never before been available. As in any new and rapidly evolving industry, the full implications are unclear, but there is no doubt that videotex will complement the traditional services supplied by data processing departments and will revolutionize the way information and services are provided within our society. □

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Database Management System
Continued from page 38

ing agencies for the health professions in California and in many other states. A neat continual education record organized by date for each personnel is desirable at inspection time.

The continual education records for a certain personnel (MK) can be retrieved by function 6 of the DBMS program. Alternatively, a formatted report can be produced by a DBR program.

The documentations of the database management package consists of a 62-page manual on the DBMS program and a 150-page manual for the DBR program. Both are easy to follow. The DBR manual is particularly well-written with many application examples. Even a novice in programming should find it easy to learn the DBR language. The detailed DBR grammar is also provided in the appendix as a reference. Error messages for the DBR compiler are summarized in the appendix, but error conditions encountered by the Structured Basic at run-time are only indicated by an error number. These error numbers are not described in the database package documentation, but are presumably explained in the Structured Basic documentation. For those who only use the data management package—without access to the Structured Basic documentations—it is a frustrating experience when run time errors do occur.

The DBMS is implemented in Structured Basic and is relatively slow in its operations. This is especially true if sort fields are used during data entry. As entry is made to the data file, the sort keys are automatically ordered and stored in the sort files. These files are updated after every new record of data is entered. As more data is entered, the system will become increasingly slugglish. If much data is to be entered into the system, Function 7 should be used to delete the sort files so that no sort file management overhead is required while entering new data. After the data is entered, the sort files can be re-created again by using Function 7. This arrangement is somewhat inconvenient.

The DBR also translates the DBR source program into a corresponding Basic program for execution. Report generation is relatively slow, especially in using large databases. Sorting is provided in ascending order only. In some applications, a combination of ascending order in some field and descending in another may be desirable. The Cromemco package allows sorting by several fields, but does not support sorting in descending order.

The DBMS program only supports fixed length data fields. This implies that the field width has to be defined wide enough to hold the largest piece of data that can potentially occur. This places some restraint on my database for unusual cases from patients. There is a variable amount of follow-up data between different cases and it is wasteful of storage space if some is allowed for more complex cases with much follow-up. In this case, most of the space reserved for follow-up will be wasted in the simpler cases with a small amount of follow-up data. The DBMS only supports two types of data—alphanumeric and integer numeric. In some applications, real or decimal values; they have to be rounded off to the nearest integer before entry into the database.

Perhaps the most serious drawback of the Cromemco program is the lack of security. There is not even single level password requirement for using and changing the database. The only way data security can be achieved is by physical security of the diskette containing the database. This is impractical when it has to be used by several users. More sophisticated packages provide many levels of security for various groups of users who may be allowed to enter data only, to examine data only, or both.

Although the Cromemco DBMS is a useful and effective program, its error-handling appears to be very weak. There is no error trapping facility and system crash can occur when errors arise. During the early usage of the DBMS program, I lost half of the records in my patient database during a system crash. Some junk was apparently written in the middle of the file and the DBMS was unable to read any data beyond that point. Since then, I have been much more cautious in making frequent backup files.

The Cromemco package is only one of dozens of available DBMS packages. *(Watch for "Special Report" in the February 1983 issue—ed.)* As demonstrated above, a good DBMS package provides a myriad of useful applications in a business environment. □

Dr. Michael K. Kan is a member of the medical staff at Scripps Memorial Hospital, La Jolla, CA and is particularly interested in structured programming and database management applications in the medical field. He is a member of Association for Computing Machinery, Society of Nuclear Medicine, American Society of Clinical Pathology, and California Medical Association.

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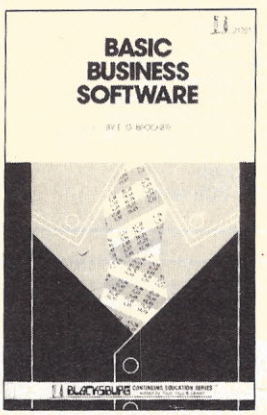
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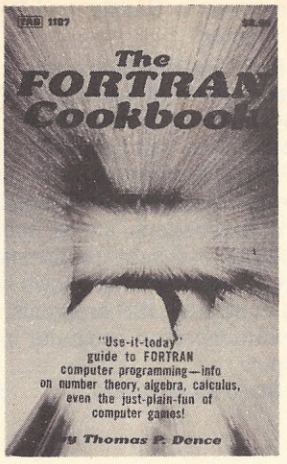
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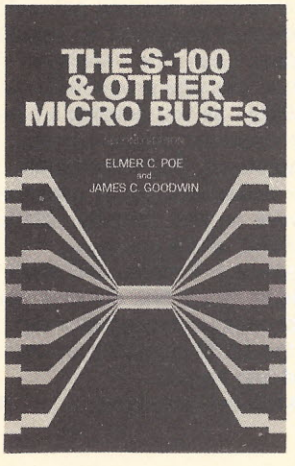
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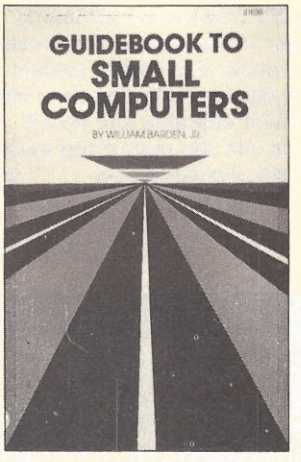
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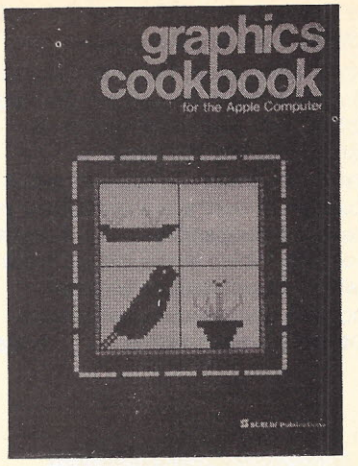
If you are contemplating buying a small computer system for your home or office, or business, this book can save you time and trouble. It contains all the information necessary for a prosepective buyer to make an intelligent selection of a small system. Featuring a survey of 21 currently popular systems with illustrations.

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Build Your Own Working Robot
By David L. Heiserman

Here are complete instructions, plans, schematics, logic circuits, and wiring diagrams for building Buster, the mechanical pet robot. He'll forage for his own "food" and scream when he can't find it. His "curiosity" will get him into one plight after another, but Buster has the capacity to get himself out of trouble just as easily as he got into it.

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Graphics Cookbook for the Apple
By Nat Wadsworth

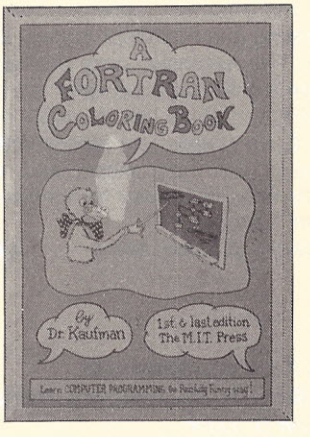
This graphics cookbook illustrates a quick and easy method of drawing pictures in the low resolution display mode. The method may be extrapolated to high resolution graphics. In an hour or two, you can be drawing complex color pictures on your video screen. You can maintain the individual elements in a picture as part of an ever-expanding graphics library.

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Instant BASIC
By Jerald R. Brown

This is a book for the microcomputer enthusiast or the user of DEC's BASIC plus language. Here is an "active participation" workbook designed to use with your home computer. It's an easy, painless way to learn BASIC.

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A FORTRAN Coloring Book
By Roger Emanuel Kaufman

Handwritten and illustrated with the author's outrageous cartoons, this book is definitely the relaxed way to learn a complex programming language. But don't be fooled by the duck on the cover, it is one of the most technically accurate and precise texts on FORTRAN currently available.

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The Computerization of Society
By Simon Nora and Alain Minc

First published in 1978 as a report to France's President, Valery Giscard D'Estain, this book became a best-seller abroad and the cause of instantaneous and widespread public discussion. It portrays a revolution, in some ways comparable to the Industrial Revolution, which is the result of the growing interconnection between computers and telecommunications.

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File Processing With COBOL
By Donald H. Beil

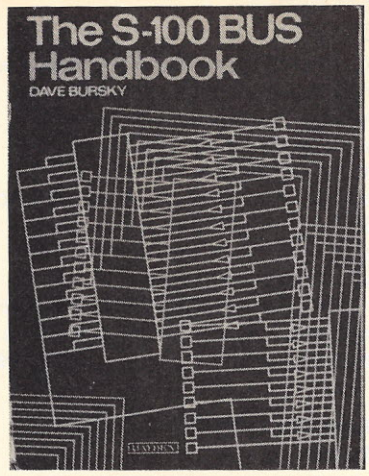
This book is designed for those who have an introductory knowledge of the COBOL language. Working on this foundation, you will learn how to create, merge, sort and update sequential and sequential indexed files in COBOL. You'll be impressed with unique flow charts at the systems level, and effective technique for presenting each concept quickly and easily. Two extensive case studies provide significant supplementary material, and show how to apply new skills. Each chapter concludes with a summary, plus programming and non-programming exercises to reinforce learned concepts.

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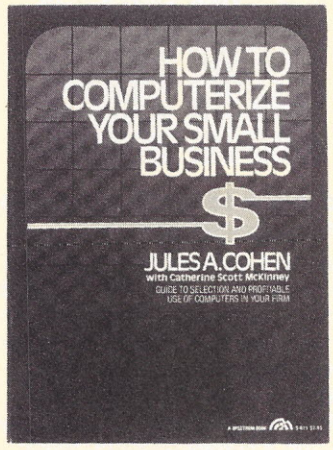
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S-100 Bus Handbook
By David Bursky

Computer fundamentals, basic electronics and the parts of the computer are covered here. The book explains all the operating details of commonly available S-100 systems. Schematic drawings of all boards discussed in the manual are provided for reference. Each major system board is discussed in complete detail, as to how it operates and how it connects into the rest of the system.

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How To Computerize Your Small Business
By Jules A. Cohen

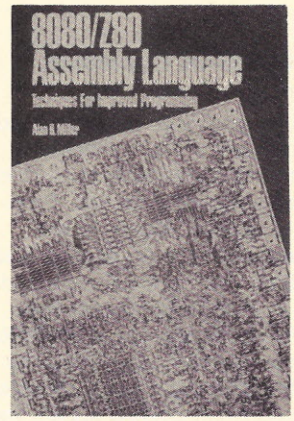
This is a complete step-by-step guide to selecting data processing equipment and services, and shows you how to plan a computer system tailored to the needs of your small business. It not only describes the basics of how a computer works, but also advantages and limitations of the most popular types of computer equipment.

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Programmer's Guide to LISP
By Ken Tracton

This fact-filled handbook offers a simplified method of learning LISP, the best known language of artificial intelligence. The first part of the book follows a logical progression to guide you through the basics of algebraic functions, expressions, atoms, symbols, lists, sublists, and subexpressions. The last part of the book shows how to write complete LISP programs, and offers instructions on computer input and output.

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8080/Z-80 Assembly Language
By Alan Miller

For both intermediate and advanced programmers, this complete guide to programming the 8080 and Z-80 microprocessors lets you get every response your computer is capable of generating. Learn the details of assembly language programming easily and quickly—as you develop a powerful system monitor in a step-by-step, top-down approach. You'll start with number bases and logical operations, then move on to branching, rotation and shifting, one's and two's complement arithmetic, and stack operations. You'll find out how your assembly language programs can utilize the CP/M operating system for all input and output.

ORDER NO. 0-471-08124-8 **$9.95**

The Joy of Minis and Micros
By Philip Stein and Howard Shapiro

Here's a collection of pieces covering technical and management aspects of the use of small computers for business or science. It emphasizes the use of common sense and good systems design for every computer project. A strong technical background is unnecessary, which makes the book neither difficult to read nor to understand.

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By Carma L. McClure, Ph.D.

In this book, the author points out how to control rising software costs by the application of software engineering principles and methodologies to software maintenance, as well as to software development activities. The author shows you how to build the quality of maintainability into a software system during the development phase and how to preserve software quality during the operation and maintenance phase. System design methods emphasizing creating software that is easy to change is the key.

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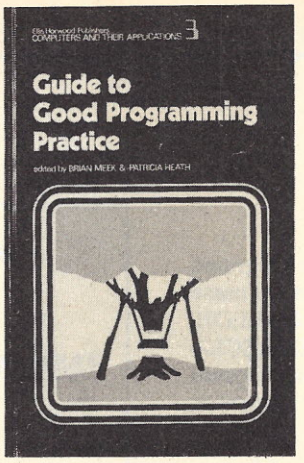


Apple II User's Guide

By Lon Poole, Martin McNiff and Steven Cook

It's all here in the new Apple II User's Guide. This guide will compliment your owner's manual and give your a heightened understanding of your Apple II. With this book you'll be able to program in BASIC. You'll be able to use the sound and graphics features of the Apple II to create your own colorful video games. There's also a review of the Apple II printer as well as a chapter on controlling "Real" processes, like burglar alarms and appliances.

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Guide to Good Programming Practice

Edited by Brian Meek and Patricia Heath

This is the first book to bring together in a compact format, real guidance on the many aspects of a computer programmer's work. The book covers structural programming and program writing techniques. But it goes further by explaining much more than that. It covers analysis, design, testing, debugging, "Tuning" for better efficiency, copying with a computer's limitations, selecting a language, language standards, program documentation, taking on another programmer's work, and more.

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Some Common BASIC Programs

By Lon Poole and Mary Borchers

This book contains program listings and documentations for 76 short programs covering financial, mathematical, statistical and general interest applications. Every program has been tested; examples and sample program runs are published with the source listings for each program.

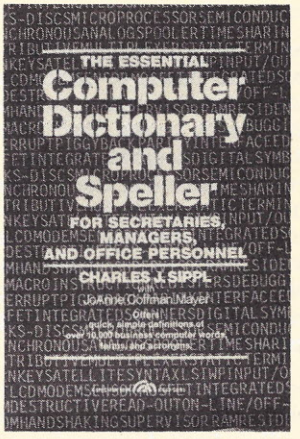
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Sargon: A Computer Chess Program

By Dan and Kathe Spracklen

Here is the computer chess program that won first place in the first chess tournament at the 1978 West Coast Computer Faire. It is written in Z-80 assembly language, using the TDL macro assembler. It comes complete with block diagram and sample printouts.

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The Essential Computer Dictionary and Speller

By Charles J. Sippl

This book is for anyone whose job requires familiarity with computer or electronic words. This book provides a reliable, fingertip source of both spellings and meanings. Handy, business-oriented dictionary defines more than 15,000 computer terms and acronyms, simply and practically. More than 100 pictures, line drawings, and other figures assist in providing clarity and greater ease-of-use for browsing and learning.

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Education

Continued from page 35

with these restrictions, there is no reason why your programs can't use any combination of alphanumeric characters to name variables. For example, MILES, MILESPERGALLON, MILEAGETOTAL, INSURANCETOTAL, or DEPRECIATION could all be valid variable names in Pre-Basic, because they would be recognized by your interpreter (the human) as separate variables.

Though Pre-Basic is slow, it does provide a means of demonstrating quite clearly to beginning programmers just how a computer program works. I find that the easiest way for someone who already knows Basic to write Pre-Basic programs is to first write the program in Basic, then translate it. However, for new programmers, the reverse should be true. The $30 computer (I figure $20 for a cassette recorder, and $10 for a four-function pocket calculator) also tends to teach good programming practices in a non-complicated way. Let beginners stumble onto the horrors of impossibly nested recursive subroutines, and FORNEXT loops after they've mastered this approach.□

Contributing editor David D. Busch has written more than 200 articles on computers, applications and word processing. His profiles of mainframe and minicomputer installations have appeared in many computer trade publications. In the past two years, he has devoted special attention to personal and small business computers, as a programmer, reporter and observer.

I(nterchange)

I(nterchange) is a general purpose file maintenance program for use with the CP/M™ operating system. Since it is a single program written in optimized Z-80™ code, it is much faster and easier to use than other file maintenance programs. Features include: DIR as usual *plus* listing all files *excluding* those with a specified character(s), ERA as usual plus *exclusive* erases. Also, a "Q" switch can be used to query each erase, a "W" allows erases of R/O files without query (normally you are queried), and an "R" switch if system files are to be included, LIST permits listings and uses TAB, WIDTH, LINES and WRAP for control, COPY as usual plus *exclusive* copies and supports the "Q", "W" and "R" switches plus an "E" switch for query on existing files, STAT with ambiguous, unambiguous and exclusive listings and produces an alphabetized listing with file length, total directory entries and space used and unused, START-END allows for copying contiguous data files, and RENAME as usual plus ambiguous renames. Other commands include: QT, DATE, TIME and SETIT (for the QT clock board) plus CLEAR, RESET, HELP and TYPE. Disk copies can even be continued after a disk full condition by simply inserting a new disk. All of this in one program without ever having to leave I(nterchange) and wait until you see the speed improvement . . .

The price for I(nterchange) is $59.95 and the manual is available for $10.00 (credited towards purchase). I(nterchange) is recommended for 32K or larger systems using CP/M™ 2.0 or later. It will not run on an 8080 CPU and only User 0 is supported.

All programs are available on 8" SD or North Star 5¼" disk. Microstat is available for North Star Basic, Microsoft's Basic-80 (Rel. 5.0 or later) or compiler Systems CBasic2. Please specify when ordering.

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Worksheet for Autocost (Pre-Basic)

VARIABLE NAME	VALUE
A	
ACCESS	
CPM	
CST	
G	
G1	
G2	
G3	
G4	
G5	
GAS	
MILES	
MPG	
MTHS	
ODOM	
P1	
P2	
P3	
P4	
P5	
PAID	
PLATES	
PMT	
PRICE	
REPAIRS	
RMT	
SELL	
START	
TI	
YIC	
YRS	

COMPUTING FOR BUSINESS

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PRESENTS

The new Basic standard for Commodore Computers

EXBASIC LEVEL II™

by Andrea Dripke

EXBASIC LEVEL II is the latest basic standard for Commodore computers. "Extended Level II Basic offers a highly expanded Level II Basic (as is available in the TRS-80) for CBM computers. **EXBASIC LEVEL II** offers more than 75 new and highly efficient functions for your CBM computer. With these functions at your disposal, programming will be much easier and far more comfortable. **EXBASIC LEVEL II** can be implemented by simply inserting two 4K-byte Eproms into two empty sockets on the computer. With a level of performance that was up to now considered to be unachievable. In addition, **EXBASIC LEVEL II** finally makes it possible for you to run your TRS-80 programs on a CBM computer, thus placing a wide selection of software at your disposal. More than 5000 **EXBASIC LEVEL II** packages have already been sold worldwide—can you afford to do without it?

Utility functions:
FIND searching for text or variables, with area specification • **AUTO** automatic line number determination • **RENUM** program line renumeration or slow program change • **DEL** delete single-step operation or slow program run with reverse sign indication of momentarily executed program line • **TRACE (OFF)** (complete line) • **ON/OFF** repeat function activation/inactivation of the keys. plus error mode: in case of program error, erroneous line will be positioned (I) be listed and cursor occurred • **DUMP** exactly where error occurred. • **MATRIX** lists all field (indexed) variables with contents • **LETTER (OFF)** rapid viewing with contents • **MEM** gives differentiated information on storage space engaged with PRINT and LIST • **STOP ON/OFF** mode to capitalism/all letter mode. • **SPACE** "THEN" and "GO" jump into monitor formation on storage area limitation for ment. "MAIN MEMORY, STRINGS, REK, FREE VARIABLES, ARRAYS, STRINGS, REK, FREE • **HIMEM** storage area limitation for machine programs • **GO** jump into monitor TIM or EXMON respectively. • **HELP** lists (OFF) key remains functional during STOP key remains functional during all EXBASIC LEVEL II commands. • **HELP*** BASIC switch from EXBASIC LEVEL II to standard Basic commands. • **HELP** lists all standard Basic commands. • **MERGE** merging of Basic program (or parts thereof) from tape/floppy disk • **MERGE*** same as MERGE. cassette.

Graphic commands:
PRINT AT print at specified viewing screen location • **VPLOT** vertical plotting • **HPLOT** horizontal plotting • **RSET** clear graphic set graphic point or not • **POINT** scan whether graphic point set or not

Mathematic functions:
MAX scans greatest value from a list of variables • **MIN** scans least value from a list of variables • **FRAC(X)** drops the digits preceding the comma • **ROUND** (X) rounds off a digit X to a whole number • **ROUNDX(Y)** rounds off a digit X to as many comma positions as indicated in Y • **ODD(X)** determines whether X is odd or even • **RND(X)** produces whole numerical random numbers between 1 and X. random • **DEC(HEX$)** converts the digit X into the corresponding hexadecimal string • **HEX$(X)** reverses the hexadecimal string into the decimal number

FAST TAPE (2000/3000/4000):
in addition to regular cassette recorder commands, new versions are available that run at a fivefold speed. Program names can now be as long as 80 characters (normally 16). **MOD** creates a program that can be read in by any other regular one, even without EXBASIC. The program at a speed five times faster. • **DOS SUPPORT (2000/3000/4000):** by using floppy short commands DOS SUPPORT facilitates floppy control programmed with EXEC. • **SCREEN SUPPORT (8000):** several viewing screen commands • **DELLINE** deletes one or more line • **INSTLINE** makes room for one or more lines • **ENDLINE** deletes all lines to the right of the cursor position up to the end of the line • **BEGINLINE** deletes all characters from the beginning of the line up to the cursor position • **SCREEN UP/DOWN** moves screen contents up or down • **SCREEN** makes the 80 character screen of the CBM 8000 fully compatible with the 40 character screen of the other series • **EXMON (8000):** EXBASIC LEVEL II contains a machine language monitor for the 8000 series II following commands are available: **A** = Assembling, **C** = Calculation of a relative offset, **D** = Disassembling of an assembler program, **E** = Execution of an assembler program, **G** = Loading a program (from cassette or disk), **M** = Hexadump, **S** = Storage of an assembler program (from cassette or disk), **T** = Hexadump, **P** = Printer, **X** = return to EXBASIC LEVEL II

In addition to the DOS SUPPORT and EXMON commands, all EXBASIC LEVEL II functions can be used in direct mode as well as within a program. Each command word is stored internally in compressed form to save storage space.

LEVEL II Basic:
ELSE possible • **IF** THEN, ELSE instructions THEN can be omitted if misinterpretation impossible • **RESTORE** with line number indication to true DATA access • **ON..RESTORE** controlled RESTORE, similar to ON..GOTO • **PRINT USING** print-out formatting onto viewing screen or printer (e.g. for comma, under comma print-out of numbers) • **DISPOSE** expansion of sub-routine levels for **REK** expansion of stack reser for FOR-NEXT loops **NEXT** stack reser for FOR-NEXT loops • **DISPOSE RETURN** jump to "emergency exit" from loop without using NEXT. • **DISPOSE CLR** recursive programming • **DISPOSE** implementing RETURN • **DISPOSE CLR** jump out of all loops and sub-routine levels of any stacking • depth of all symbols. **INPUTLINE** possible input of quotation marks, including commas, quotation marks, control signs, colons. In case of empty entries, program will not be inter-rupted but entry variable will retain its previous value. • **INPUTFORM** input of standard signs (no cursor control or reverse signs), but comma, quotation marks, etc.), otherwise like INPUTLINE. • **DEF CALL=** Among other things, a certain entry length can be specified. • **DEF CALL=** machine programs with parameter defines USR vector. • **CALL** scanning of machine programs with parameter list. • **DOKE** double byte POKE up to 65535 • **DEEK** double byte PEEK. • **SPACE** a certain variable is stored. • **SWAP** display of defined viewing screen (S..) is equal in meaning to AS = STRING$ (S..,1) • **INSTR** determines whether a string is contained within another string. • **EVAL** resembles VAL, but VAL (" 12.4 ") delivers the value 12. EVAL (" 12*4 ") delivers the value 48 • **EVAL** recognizes all functions in strings. • **SSC** exchanges the values of two variables without the aid of a third one. • **SSC** displays the value of CB2. Sound pitch and duration may be specified. • **ON** program halt for X seconds. Sound pitch and duration of CB2. Sound • **ON** program may be specified. • **RESUME** ends error GOTO with several possibilities. RESUME, RESUME NEXT, RESUME line number, ..., abbreviation for the command REM. • **HARDCOPY** transfers screen contents to printer

User Manual
With your **EXBASIC LEVEL II** you will receive a detailed user manual. It contains installation procedures, command explanations, a training course in LEVEL II Basic and many examples. Contrary to most other "user manuals", it is not a badly translated, short description of commands, but rather a structured book, which gradually approaches the new possibilities provided by **EXBASIC LEVEL II**.
The **EXBASIC LEVEL II** User Manual can be purchased individually for $12 from the address on the coupon below. We're convinced—if you read the book today, you will be working with **EXBASIC LEVEL II** tomorrow.

SOFTMODULE–EXBASIC LEVEL II can be enhanced by SOFTMODULES. A SOFTMODULE is an assembler program that is being loaded into the computer; it extends the **EXBASIC LEVEL II** command set. This means that **EXBASIC LEVEL II** owners have access to a selection of SOFTMODULES that can be added at random. In other words, you decide to what extent you want to expand **EXBASIC LEVEL II**. **EXBASIC LEVEL II** is equipped with two standard SOFTMODULES containing the commands SORT/CLEAR and GOTO X/GOSUB X. Further SOFTMODULES will be available soon. MODULES containing multiple precision arithmetic, expanded graphic, program coding and decoding, matrix calculus, search & replace and many more. Provide the basis for your future development now—with **EXBASIC LEVEL II**.

If we convinced you that **EXBASIC LEVEL II** is just right for you (if we didn't, just read this ad again), you should order it right away by mailing the attached order form. Please clearly specify the type of CBM computer you will be using with your **EXBASIC LEVEL II** by entering the corresponding digit (1 through 6) under the column entitled "series":

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☐ ☐ ☐ ☐ ☐ check (must be in U.S. funds drawn on U.S. bank)

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Signature _____
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Listing 1. Autocost program in pre-Basic

```
1 "THIS IS AN AUTO  COST PROGRAM. YOU WILL BE ASKED TO PERFORM
 CERTAIN FUNCTIONS ON YOUR POCKET CALCULATOR, AND WRITE THE TOTALS
 NEXT TO CERTAIN VARIABLES ON YOUR LIST. IF A TOTAL ALREADY EXISTS
 BY THAT VARIABLE, CROSS IT OUT, AND ENTER"I

2 "THE NEW TOTAL NEXT TO IT.  WHEN YOU HEAR THE WORD 'PAUSE'
 SHUT OFF THE TAPE

3 "BEFORE STARTING, RESET YOUR RECORDER'S TAPE COUNTER TO ZERO.
 YOU WILL BE ASKED TO ADVANCE TO A DIFFERENT INDEX MARK FROM TIME TO TIME."

10  "IS THIS CAR LEASED OR PURCHASED"
20  "IF THE CAR IS LEASED, WRITE A ONE NEXT TO VARIABLE A"
25  "IF THE CAR IS PURCHASED, WRITE A TWO NEXT TO VARIABLE A"
30  "PAUSE..."
35  " OKAY. LOOK AT VARIABLE A. IF IT EQUALS ONE, ADVANCE THE RECORDER
     TO INDEX 50. IF IT EQUALS TWO, ADVANCE TO INDEX 90."
50  "WRITE DOWN THE AMOUNT OF THE MONTHLY LEASE PAYMENTS NEXT TO
    VARIABLE PMT"
55 "PAUSE"
60 "WRITE DOWN NEXT TO VARIABLE MTHS THE NUMBER OF MONTHS THE LEASE
    HAS RUN TO DATE"
65 "PAUSE"
70 "MULTIPLY VARIABLE PMT BY VARIABLE MTHS AND WRITE THE RESULT DOWN
    NEXT TO VARIABLE PAID"
72 "PAUSE"
75 "ADVANCE TO INDEX 140 ON THE RECORDER"
90 "WRITE DOWN NEXT TO VARIABLE MTHS THE NUMBER OF MONTHS YOU HAVE
    OWNED THE CAR"
95 "PAUSE"
100 "WRITE DOWN NEXT TO VARIABLE PRICE THE AMOUNT YOU PAID FOR THE
    CAR -- INCLUDING TAX, INTEREST ON LOAN."
110 "PAUSE"
120 "WRITE DOWN NEXT TO VARIABLE SELL HOW MUCH YOU THINK YOUR CAR IS
     WORTH NOW"
125 "PAUSE"
130 "LOOK AT VARIABLES PRICE AND SELL.  SUBTRACT THE VALUE OF SELL
    FROM PRICE, AND ENTER THE RESULT NEXT TO VARIABLE PAID."
135 "PAUSE"
140 "WRITE DOWN THE MILEAGE OF YOUR CAR WHEN YOU BOUGHT IT NEXT TO
    VARIABLE START"
145 "PAUSE"
150 "WRITE DOWN ITS CURRENT MILEAGE NEXT TO VARIABLE ODOM"
155 "PAUSE"
160 "SUBTRACT THE VALUE WRITTEN NEXT TO START FROM THE VALUE WRITTEN
     NEXT TO ODOM, AND WRITE THE RESULT NEXT TO VARIABLE MILES"
165 "PAUSE"
170 "DIVIDE THE VALUE NEXT TO VARIABLE MTHS BY 12, AND ENTER THE RESULT
     NEXT TO VARIABLE YRS."
```

```
175 "PAUSE"
180 "YOU HAVE OWNED THIS CAR FOR AS MANY YEARS AS THE FIGURE WRITTEN
     NEXT TO VARIABLE YRS"
190 "PLEASE ESTIMATE HOW MUCH OF YOUR DRIVING TOOK PLACE IN EACH OF
    THE FOLLOWING YEARS. USE WHOLE NUMBER PERCENTAGES, SUCH AS 25
    PERCENT, ETC."
220 "HOW MUCH IN 1976? WRITE YOUR ANSWER NEXT TO VARIABLE P1"
225 "PAUSE"
230 "HOW MUCH IN 1977? WRITE YOUR ANSWER NEXT TO VARIABLE P2"
235 "PAUSE"
240 "HOW MUCH IN 1977? WRITE YOUR ANSWER NEXT TO VARIABLE P2"
245 "PAUSE"
250 "HOW MUCH IN 1978? WRITE YOUR ANSWER NEXT TO VARIABLE P3"
255 "PAUSE"
260 "HOW MUCH IN 1979? WRITE YOUR ANSWER NEXT TO VARIABLE P4"
265 "PAUSE"
270 "HOW MUCH IN 1980? WRITE YOUR ANSWER NEXT TO VARIABLE P5"
275 "PAUSE"
280 "ADD VARIABLES P1,P2,P3,P4,AND P5 IF THE TOTAL DOES NOT EQUAL
    EXACTLY 100 REWIND TO INDEX 220"
300 "WRITE DOWN THE NUMBER OF MILES PER GALLON YOU GET NEXT TO VARIABLE MPG"
310 "PAUSE"
320 "DIVIDE THE  FIGURE NEXT TO P1 BY THE NUMBER NEXT TO VARIABLE MPG
    , AND WRITE THE TOTAL NEXT TO G1"
335 "PAUSE"
340 "MULTIPLY THE FIGURE NEXT TO G1 BY VARIABLE MILES, AND WRITE THAT
     FIGURE NEXT TO G1"
345 "PAUSE"
350 "MULTIPLY THE FIGURE NEXT TO G1 BY .55, AND WRITE THE TOTAL NEXT
     TO G1"
355 "PAUSE"
360 "DIVIDE THE  FIGURE NEXT TO P2 BY THE NUMBER NEXT TO VARIABLE MPG
    , AND WRITE THE TOTAL NEXT TO G2"
365 "PAUSE"
370 "MULTIPLY THE FIGURE NEXT TO G2 BY VARIABLE MILES, AND WRITE THAT
     FIGURE NEXT TO G2"
375 "PAUSE"
380 "MULTIPLY THE FIGURE NEXT TO G2 BY .65, AND WRITE THE TOTAL NEXT
     TO G2"
385 "PAUSE"
390 "DIVIDE THE  FIGURE NEXT TO P3 BY THE NUMBER NEXT TO VARIABLE MPG
    , AND WRITE THE TOTAL NEXT TO G3"
395 "PAUSE"
400 "MULTIPLY THE FIGURE NEXT TO G3 BY VARIABLE MILES, AND WRITE THAT
     FIGURE NEXT TO G3"
405 "PAUSE"
410 "MULTIPLY THE FIGURE NEXT TO G3 BY .75, AND WRITE THE TOTAL NEXT
     TO G3"
415 "PAUSE"
420 "DIVIDE THE  FIGURE NEXT TO P4 BY THE NUMBER NEXT TO VARIABLE MPG
    , AND WRITE THE TOTAL NEXT TO G4"
```

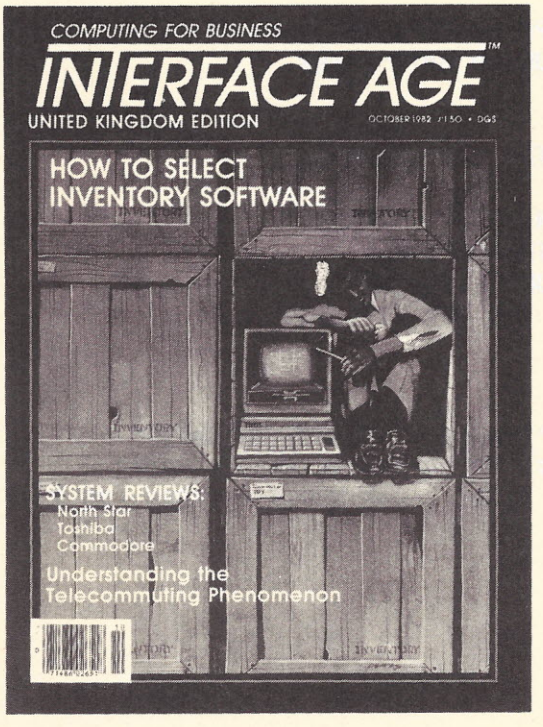
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425 "PAUSE"
430 "MULTIPLY THE FIGURE NEXT TO G4 BY VARIABLE MILES, AND WRITE THAT
     FIGURE NEXT TO G4"
435 "PAUSE"
440 "MULTIPLY THE FIGURE NEXT TO G4 BY .90 AND WRITE THE TOTAL NEXT
    TO G4
445 "PAUSE"
450 "DIVIDE THE  FIGURE NEXT TO P5 BY THE NUMBER NEXT TO VARIABLE MPG
    , AND WRITE THE TOTAL NEXT TO G5"
455 "PAUSE"
460 "MULTIPLY THE FIGURE NEXT TO G5 BY VARIABLE MILES, AND WRITE THAT
     FIGURE NEXT TO G5"
465 "PAUSE"
470 "MULTIPLY THE FIGURE NEXT TO G5 BY 1.25, AND WRITE THE TOTAL NEXT
     TO G5"
475 "PAUSE"
480 "ADD THE NUMBERS NEXT TO G1,G2,G3,G4,AND G5, AND MULTIPLY THE RESULT
     BY THE NUMBER NEXT TO VARIABLE MILES"
485 "PAUSE"
490 "DIVIDE THE ANSWER BY 100,AND WRITE THE RESULT NEXT TO VARIABLE
    GAS"
495 "PAUSE"
500 "WRITE YOUR YEARLY INSURANCE COSTS NEXT TO VARIABLE YIC"
505 "PAUSE"
510 "WRITE YOUR YEARLY REGISTRATION COSTS NEXT TO VARIABLE PLATES"
515 "PAUSE"
520 "WRITE DOWN TOTAL REPAIR COSTS TO DATE NEXT TO VARIABLE REPAIRS"
525 "PAUSE"
530 "WRITE DOWN AMOUNT SPENT TO DATE FOR ACCESSORIES OR REPLACEMENT
    ITEMS SUCH AS TIRES NEXT TO VARIABLE ACCESS"
535 "PAUSE"
540 "WRITE DOWN AMOUNT SPENT FOR ROUTINE MAINTENANCE NEXT TO VARIABLE RMT"
545 "PAUSE"
550 "DIVIDE THE VALUE OF VARIABALE YIC BY 12, MULTIPLY THAT BY THE
    VALUE OF MTHS, AND WRITE THE RESULT NEXT TO VARIABLE TI"
555 "PAUSE"
560 "DIVIDE THE VALUE OF THE VARIABLE PLATES BY 12 , MULTIPLY THAT
    BY THE VALUE OF MTHS, AND WRITE THE RESULT NEXT TO VARIABLE PLATES."
565 "PAUSE"
570 "ADD THE VALUES NEXT TO VARIABLES TI,PLATES, PAID,GAS, AND REPAIRS
      AND WRITE THIS TOTAL NEXT TO VARIABLE CST"
575 "PAUSE"
580 "THIS VEHICLE HAS COST YOU THE VALUE NEXT TO VARIABLE CST TO
    DRIVE TO DATE"
585 "PAUSE"
590 "TO FIND OUT HOW MANY CENTS PER MILE THIS IS, DIVIDE THE VALUE
    OF CST BY THE VALUE OF MILES, AND MULTIPLY BY 100. WRITE THIS TOTAL
     NEXT TO VARIABLE CPM."
595 "PAUSE"
600 "THAT IS THE END OF THIS PROGRAM. TO RUN AGAIN, REWIND TO ZERO"
```

Listing 2. Autocost program in Baisc

```
10 PRINT " IS THIS CAR  1.)  LEASED     2.) PURCHASED ?"
20 INPUT A
30 IF A=1 GOTO 50
40 GOTO 90
50 INPUT "HOW MUCH ARE THE MONTHLY LEASE PAYMENTS"; PMT
60 INPUT "HOW MANY MONTHS HAS THE LEASE RUN TO DATE";MTHS
70 PAID=PMT*MTHS
80 GOTO 140
90 INPUT "HOW MANY MONTHS HAVE YOU OWNED THE CAR";MTHS
100 PRINT "HOW MUCH DID YOU PAY FOR IT ?"
110 INPUT "INCLUDE TAXES, INTEREST ON LOAN, ETC.  ";PRICE
120 INPUT "HOW MUCH DO YOU THINK IT'S WORTH NOW";SELL
130 PAID=PRICE-SELL '          CALCULATES DEPRECIATION
140 INPUT"WHAT WAS THE CAR'S MILEAGE WHEN YOU GOT IT";START
150 INPUT "WHAT IS ITS MILEAGE NOW";ODOM
160 MILES=ODOM-START
170 YRS=MTHS/12
180  PRINT "YOU HAVE OWNED THIS CAR";YRS;"YEAR(S).  PLEASE ESTIMATE"
190 PRINT "WHAT PERCENTAGE OF THE ";MILES;" MILES YOU'VE DRIVEN TOOK"
200 PRINT "PLACE IN EACH OF THE FOLLOWING YEARS . USE WHOLE NUMBERS (25 %):"
210 PRINT
220 PRINT"  1976   .50-.60 PER GALLON";
230 INPUT"  ESTIMATE ";P1
240 G=G+P1
250 PRINT "TOTAL SO FAR";G;"PERCENT"
260 PRINT"  1977   .60-.70 PER GALLON";
270 INPUT"  ESTIMATE ";P2
280 G=G+P2
290 PRINT "TOTAL SO FAR ";G;" PERCENT"
300 PRINT"  1978   .70-.80 PER GALLON";
310 INPUT"  ESTIMATE ";P3
320 G=G+P3
330 PRINT "TOTAL SO FAR ";G;"PERCENT"
340 PRINT"  1979   .80-1.00 PER GALLON";
350 INPUT "  ESTIMATE ";P4
360 G=G+P4
370 PRINT "TOTAL SO FAR ";G;"PERCENT"
380 PRINT"  1980  1.00-1.50 PER GALLON";
390 INPUT "  ESTIMATE ";P5
400 G=G+P5
410 IF G<>100 PRINT "THAT DOES NOT EQUAL 100 PERCENT": PRINT: G=0: GOTO 220
420 INPUT "ABOUT HOW MANY MILES PER GALLON DO YOU GET";MPG
430 GAS=MILES*P1/MPG*.55
440 GAS=GAS+MILES*P2/MPG*.65
450 GAS=GAS+MILES*P3/MPG*.75
460 GAS=GAS+MILES*P4/MPG*.90
470 GAS=GAS+MILES*P5/MPG*1.25
480 GAS=GAS/100
490 INPUT "ENTER YOUR YEARLY INSURANCE COSTS";YIC
500 INPUT "HOW MUCH DO YOU PAY FOR REGISTRATION YEARLY";PLATES
510 INPUT "HOW MUCH HAVE YOU PAID FOR REPAIRS TO DATE";REPAIRS
```

1982 Index to
INTERFACE AGE

compiled by *IA* Staff



The introduction to last December's 1981 editorial index spoke of *Interface Age's* shift in direction to practical computer endeavors—away from the traditional hobbyist/home motif. That trend accelerated during the early months of 1982 and reached full fruition with the August issue, which dropped the "and home" from the magazine's subtitle "Computing for Business and Home."

Design and format changes accompanied the change in editorial direction, but the magazine's essential philosphy has always remained the same: to acquaint the computer user with the abundance of useful products and services at his disposal. During 1982, an increase in product reviews/comparisons and implementation tips emphasized *IA's* evolution into a true consumer publication.

Since the purpose of this index is to catalog a wide array of topics within a limited space, it is subject-oriented, rather than by article title. All topics covered in 1981—regular monthly columns, features, editorials and book reviews—are included. Hardware and software reviews are alphabetized by the manufacturer name, rather than the product name. Whenever applicable, cross-referencing is utilized.

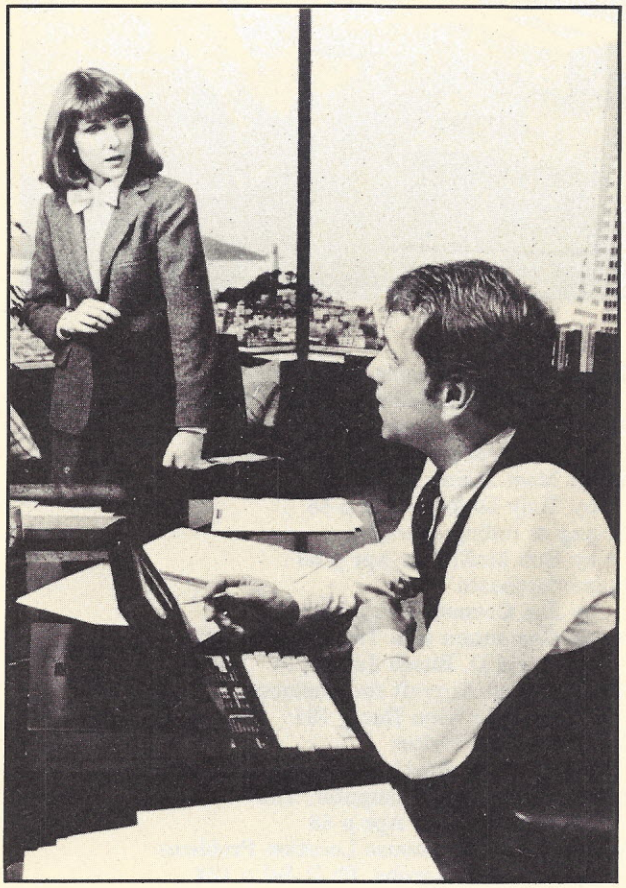
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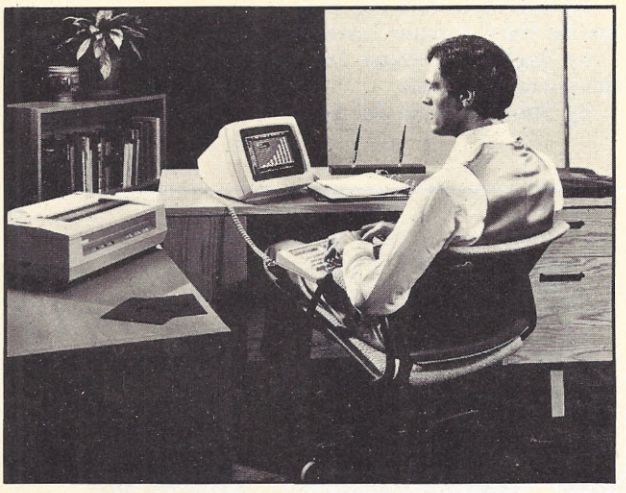
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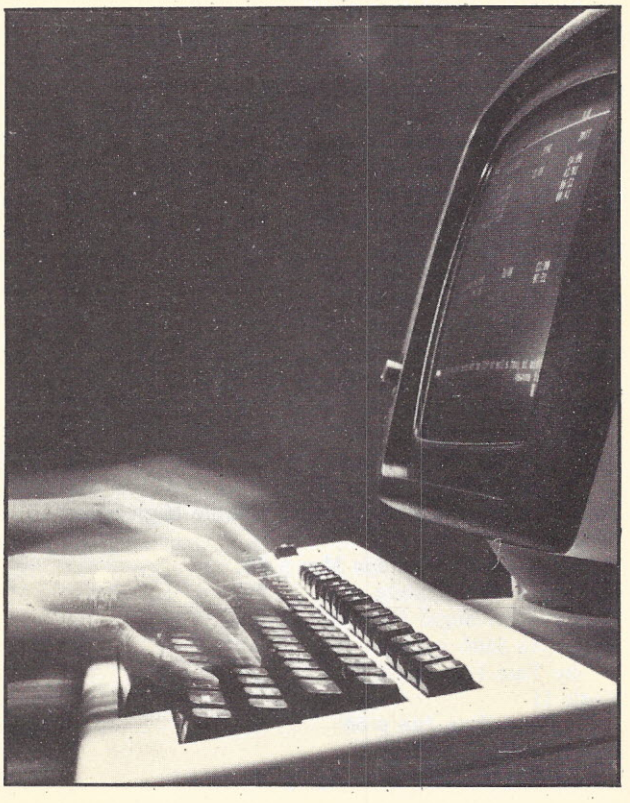
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The Word Processing Book: A Short Course in Computer Literacy

by Peter McWilliams
Prelude Press, Los Angeles, CA

Reviewed by Dona Z. Meilach

This is a delightful, easy-to-read, well-balanced discussion of word processing. The charming style will often make you laugh out loud while yielding valuable insight into the joys and frustrations of feeding words into a computer.

I don't know whether it was intentional or accidental that an index was omitted. To discover what was in the pages, I was enticed to carefully read through everything. While searching for what I wanted, I was often sidetracked and captivated by other portions of the book.

From an overview of how most people become aware of computers, the author tackles the use of word processors in the office, for writers, students and others. From there he discusses—gently, wisely, and with wit—the procedures for selecting and purchasing a word processor and its hardware. The list of features a word processor should have is not comprehensive, but you get the idea. This is more an introduction to word processing than an in-depth survey.

You'll enjoy the homey illustrations culled from a variety of public domain drawings and the tongue-in-check captions. The photos of computers leave much to be desired.

It's a nice gift for yourself and for the person thinking of—or already into—word processing. There aren't too many fun books on the computer bookshelf.

234 pages $10

Graphic Software for Microcomputers—Theory and Programs

by B. J. Korites
Kern Publications, Duxbury, MA

Reviewed by Derek Enlander, M.D.

A must for those interested in computer graphics, the book lists 61 various programs in a tutorial fashion. The reader is led in a stepwise progression through the theoretical concepts of programming computer graphics in Basic. The coding is immediately directed to the Apple II, but translation for other microcomputers should prove relatively easy.

Initially, it explains very basic plotting by drawing simple lines. The reader has the opportunity to develop a good understanding of graphics and graphic coordinates. Then principles of vector mathematics are explained, a difficult concept that is well-handled. With vector addition and subtraction, we can manipulate graphics. The book progresses from 2D to 3D graphics and explains matrix arithematic for 3D procedures. Rotation, scaling, perspective and hidden line programs are explored. Shading of the 3D graphics give an added feel to the drawing and can be printed, as can all the routines, on a standard printer. The book concludes with a series of practice problems.

200 pages $22.95

How to Select a Business Computer

by Billie Cayot, David Campbell & Norm Stone
Oasis Press, Sunnyvale, CA

Reviewed by Dan W. Post

Tagged by the publisher as an "interactive resource," this how-to manual provides a structured process for determining system needs and evaluating the alternatives pertinent to those requirements. Extensive worksheets, checklists and evaluation forms enable a purchaser to establish specific criteria and communicate with vendors from a common terminology base. This is especially valuable when obtaining bids and cost estimates.

The materials are assembled in an attractive three-ring binder, which permits inclusion of supplemental documents and restructuring to reflect an individual business's priorities. Text is divided according to five major sections indicated by index tabs. These are: "Before You Install a Computer," "Needs Assessment," "Request for Proposal," "Leave or Buy?" and "Purchase Agreements." This manual is suitable for vendors and consultants as well as individual consumers. To abide fully by the process suggested is to invest considerable time, but it offers excellent protection against making costly errors in terms of lost customers, frustrated employees and deflated cash flow.

Approximately 180 pages $29.95

Information Systems in the 80s: Markets, Products and Vendors

by Ulric Weil
Prentice-Hall, Englewood Cliffs, NJ

According to the author, information systems field includes traditional data processing, data/voice communications, word processing and reprographics. His study of the strategies used to exploit market opportunities and also the benefits users can expect is based on the contention that all these disciplines are converging into an autonomous technology. He then examines specific characteristics of individual facets such as personal computing, CAD/CAM, and office automation and analyzes the variables propogated by the relative strengths and weaknesses of key industry vendors and the structures of existing and emerging markets. The depth of this material is evident in chapter designations ranging from packaged software's impact on the consumer to the Japanese effect on the U.S. computer industry. A substantial body of charts and tables provide valuable graphic support to the text and the book is well-indexed. It is a timely reference for industry observers. *—DWP*

363 pages $29.95

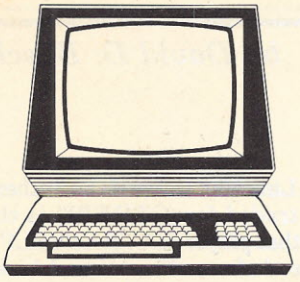
A Guide for Software Entrepreneurs

by A. L. Frank
Prentice-Hall, Englewood Cliffs, NJ

For obvious reasons, computer programmers are particularly well-suited to entrepreneurial ventures. This motivating book offers the prospective software designer a structured approach to entering the markeplace; it is business-oriented rather than technically informative. Generating a profit is the underlying theme to this discussion of planning, product design, implementation, testing, marketing and sales. There are several appendices dealing with areas such as venture capital and legal protection.

It doesn't provide a formula for guaranteed success or make available any guarded secrets, but Frank's work should help the conscientious programmer minimize the risks and unknowns in becoming an independent producer. Since there are a number of books describing the actual engineering of programs, he makes no claims in that arena. Readers are encouraged to recognize that "some very poor technical products with totally inelegant code have led to major successes—while many very good technical creations have failed miserably." *—DWP*

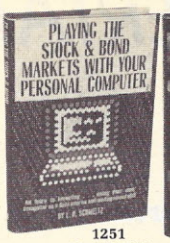
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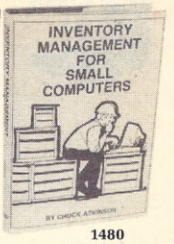
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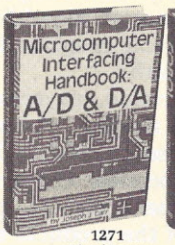
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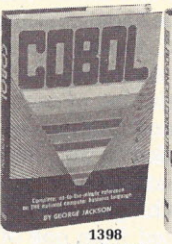
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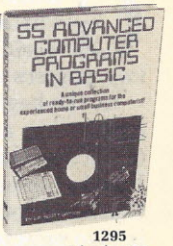
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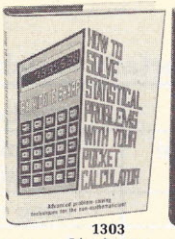
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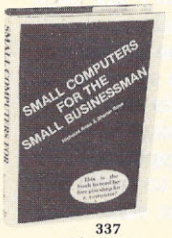
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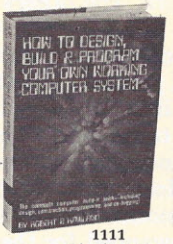
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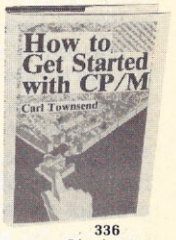
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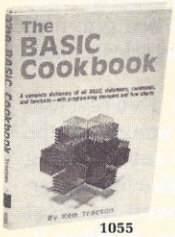
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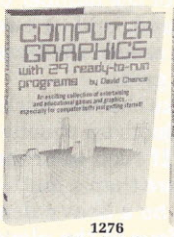
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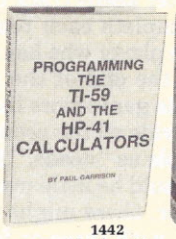
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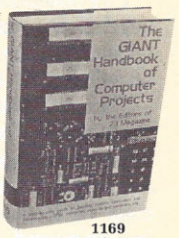
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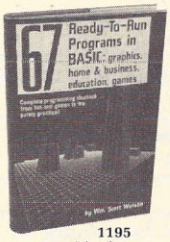
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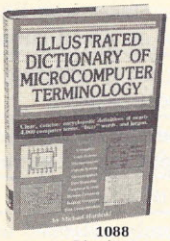
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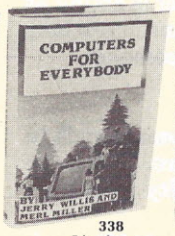
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CIRCLE NO. 109 ON INQUIRY CARD

by David D. Busch

Barter

Games and simulations allow computerists to learn a little about mathematical algorithms and the real world. Barter is a Basic program that lets one or two players do a little of both.

At the beginning of each round, players are assigned an occupation and product at random, chosen from Doctor (medicine), Baker (bread), Shoemaker (shoes), Toymaker (toys), Butcher (meat), Grocer (groceries), Carpenter (furniture), Clothier (clothing) and Farmer (milk). The player's "need" is also selected from one of the products supplied by the other neighbors. The others in the community are each assigned two products that they need as well.

The object of the round is to trade what the player has for the target product, in as few transactions as possible. For example, if the player is the Doctor and his need is for Toys, a direct trade could be made if the Toymaker required Medicine as one of his two needs. This will happen only infrequently. More often, the player will have to trade one product for another several times to arrive at something that can be swapped for the target good.

The computer keeps track of the number of transactions needed to complete each round, and, if two are playing, announces the player who has needed the fewest tries overall as winner at the end of the game.

To make this game more like the real world, I've resisted the urge to divide all the products up equally among all the business people as "needs." If such were the case, solving each round would be little more than a math-like logic exercise. In Barter, there might be a heavy demand for meat in one round, with three or four of the players needing it, while only one might want shoes. If the player is acting as a Butcher that round, he will have many options in reaching his desired product—less so if he is the Shoemaker.

Player has option to quit

With this type of allocation, there will be some rounds in which it is impossible to "get there from here." Then the player can quit the round, and take 10 penalty points. So much for the rules.

Barter is a relatively simple program, written in Microsoft Basic, and adaptable to any dialect with string arrays. Lines 20-180 set up the instructions, while Lines 200-230 allow the input of number of players and their names. If A (the number of players input in Line 210)=2, then their names are stored in PL$(1) and PL$(2). Their scores are stored in a numerical array, SC(1) and SC(2). If two are playing, rounds alternate between player one and player two through a FOR-NEXT loop (FOR PLAYER=1 TO 2) nested within another FOR-NEXT loop (FOR L=1 TO ROUND) that counts the number of rounds played. The only housekeeping done before the start of play is to read the occupations and products from DATA into two string arrays, OCCUP$(n) and PROD$(n), respectively.

Within the two loops, the action of each round takes place. First the number of the occupation of the player is selected in Line 370, then the needs of both the player and his neighbors are selected in Lines 390-470. Pairs of different random numbers (X and Y) between 1-9 are generated. These are tested to make sure that they are not equal to N3. If this were the case, then OCCUP$(N3) would need PROD$(N3), which is its own product. If the random numbers pass the test, the products stored in PROD$(X) and PROD$(Y) are assigned to the two need arrays, NEED$(n) and EXTRA$(n).

The next step is to check (in Line 500) to see if the "other" product that the player has traded for (OTHER$) is the designated needed product for that player (EXTRA$(SELF)). If so, control branches to the "end of round" routine at Lines 870-950, which increments the score and either starts the next round, or lets the second player have his turn.

If the player has yet to complete the series of trades, the transaction counter,TRANS, is incremented by one, and the current status of play listed to the screen. The player is called by name, if appropriate, reminded of his occupation, product, and need; then he is shown the occupations, products and needs remaining among his neighbors.

Important variables used in program

A	Number of players in the game
EXTRA$(n)	One of the needs of the player and his neighbor
L	Loop counter for rounds played
N1-N5	Loop counters
NEED$(n)	The other need of the neighbors
NU	Number pointing to tradee selected by player
OCCUP$(n)	String array storing names of the nine occupations
OTHER$	The other product owned by player, after initial trade
PL$(n)	Name of player
PLAYER	Loop counter pointing to player in control at given time
PROD$(n)	String array storing products of the nine occupations
ROUND	Number of rounds selected for play at beginning of game
SC(n)	Score of PLAYER
SELF	Randomly selected at beginning of each turn, points to occupation of PLAYER
TRANS	Number of transactions required in turn to complete trades
X	Random number
Y	Random number

The player is given the opportunity to select the number signifying the neighbor for the next trading session. By inputting a "Q" (for quit), the player can exit from a no-win situation and take his penalty points. Otherwise, the program tests to see if the trade is legal under the rules. The player's PROD$(SELF) or OTHER$ must equal the target neighbor's NEED$(n) or EXTRA$(n). If so, the trade is completed, that neighbor's need nullified (Line 770), and the player's OTHER$ value converted to that of the product offered by the tradee, in line 790.

This cycle is completed until the player quits or trades for his target product. At the end of the game, the score of a single player is printed out (Line 990) or the scores of two competing players are compared to declare the lowest, the winner or a tie, as appropriate.

Those wishing to alter this program can expand the number of occupations by adding DATA elements as appropriate, and expanding the appropriate FOR-NEXT loops past 9. I stopped at 9 because that was the maximum number that would fit comfortably on the CRT layout I devised for this game. Enlarging the string arrays past 10 or 11 may require DIMension statements in some Basics. □

Contributing editor David D. Busch has written more than 200 articles about computers, applications and word processing. His profiles of mainframe and minicomputer installations have appeared in many computer trade publications. In the past two years, he has devoted special attention to personal and small business computers, as a programmer, reporter and observer.

Program listing

```
20 '****** INSTRUCTIONS ******

30 CLS:PRINT:PRINT
40 INPUT"DO YOU WANT INSTRUCTIONS";A$
50 IF LEFT$(A$,1)="N" GOTO 200
60 CLS:PRINT:PRINT
70 PRINT "THIS IS THE GAME OF BARTER, FOR ONE OR TWO PLAYERS."
80 PRINT "DURING THE GAME, YOU WILL ASSUME VARIOUS OCCUPATIONS,"
90 PRINT "SUCH AS DOCTOR, FARMER, OR BUTCHER, AND WILL ATTEMPT "
100 PRINT "TO TRADE YOUR PRODUCTS WITH OTHERS IN YOUR COMMUNITY "
110 PRINT "IN ORDER TO FINISH WITH THE ITEM YOU NEED.  YOU MAY"
120 PRINT "NEED SEVERAL TRADES TO ACHIEVE YOUR GOAL.  THE OBJECT"
130 PRINT"IS TO TRADE EFFICIENTLY, AND FINISH WITH AS FEW TRANS-"
140 PRINT "ACTIONS AS POSSIBLE.  IF NO ONE WANTS THE GOODS YOU"
150 PRINT "HAVE, ENTER  'Q' INSTEAD OF A NUMBER TO FORFEIT TURN."
160 PRINT
170 PRINT "          *** HIT ENTER TO CONTINUE ***";
180 INPUT A$
190 '****** ENTER NUMBER OF PLAYERS, AND NAMES ******

200 CLS
210 INPUT" ONE PLAYER OR TWO ";A$
220 A=VAL(A$):IF A<1 OR A>2 GOTO 210
230 IF A=2 THEN INPUT "ENTER PLAYER #1'S NAME";PL$(1):INPUT"ENTER PLAYER #2'S NAME";PL$(2)
240 INPUT"HOW MANY ROUNDS WOULD YOU LIKE TO PLAY";ROUND$
250 ROUND=VAL(ROUND$)
260 DATA MEDICINE,BREAD,SHOES,TOYS,MEAT,GROCERIES,FURNITURE,CLOTHING,MILK
270 DATA DOCTOR,BAKER,SHOEMAKER,TOYMAKER,BUTCHER,GROCER,CARPENTER,CLOTHIER,FARMER
280 '****** READ OCCUPATIONS AND PRODUCTS INTO ARRAY ******

290 FOR N1=1 TO 9:READ PROD$(N1):NEXT N1
300 FOR N2=1 TO 9:READ OCCUP$(N2):NEXT N2
310 '****** LOOP  NUMBER OF ROUNDS SPECIFIED ******

320 FOR L=1 TO ROUND
330 IF A=2 THEN FOR PLAYER=1 TO 2
340 CLS:PRINT
350 OTHER$=""
360 '****** SELECT PLAYER'S OCCUPATION AT RANDOM ******

370 SELF=RND(9)
380 '****** SELECT TWO DIFFERENT NEEDS AT RANDOM FOR EACH NEIGHBOR ******
390 FOR N3=1 TO 9
400 X=RND(9)
410 Y=RND(9)
420 IF X=Y GOTO 410
430 IF X=N3 GOTO 400
440 IF Y=N3 GOTO 410
450 EXTRA$(N3)=PROD$(Y)
```

```
460 NEED$(N3)=PROD$(X)
470 NEXT N3
475 TRANS=-1
480 CLS
490 '****** CHECK TO SEE IF PLAYER HAS TRADED SUCESSFULLY ******

500 IF OTHER$=EXTRA$(SELF) GOTO 850
510 TRANS=TRANS+1
520 '****** LIST STATUS TO SCREEN ******

530 IF A=2 THEN PRINT PL$(PLAYER);" , ";
540 PRINT "YOU ARE A ";OCCUP$(SELF);". (OCCUPATION NO. ";SELF;")"
550 PRINT "YOU HAVE ";PROD$(SELF);
560 IF OTHER$<>""PRINT" AND ";OTHER$;".";
570 IF OTHER$="" PRINT".";
580 PRINT TAB(40) "YOU NEED ";EXTRA$(SELF);"."
590 PRINT
600 PRINT "HERE ARE YOUR NEIGHBORS :"
610 PRINT"OCCUPATION","HAS","NEEDS"
620 PRINT
630 FOR N5=1 TO 9
640 IF N5=SELF GOTO 670
650 PRINT N5;".) ";
660 PRINT OCCUP$(N5),PROD$(N5),EXTRA$(N5),NEED$(N5)
670 NEXT N5
680 PRINT:INPUT"ENTER NUMBER OF NEIGHBOR YOU'D LIKE TO TRADE WITH";NU$
690 '****** IF PLAYER SEES NO WIN SITUATION, GO TO PENALTY ROUTINE ******

700 IF LEFT$(NU$,1)="Q" GOTO 1120
710 NU=VAL(NU$)
720 '****** CHECK TO SEE IF TRADE POSSIBLE ******

730 IF NU=SELF THEN CLS:PRINT "YOU CAN'T TRADE WITH YOURSELF":PRINT:GOTO 540
740 IF PROD$(SELF)=EXTRA$(NU) OR OTHER$=EXTRA$(NU) GOTO 760
750 IF PROD$(SELF)=NEED$(NU) OR OTHER$=NEED$(NU) GOTO 790
760 OTHER$=PROD$(NU)
770 EXTRA$(NU)=""
780 GOTO 480
790 OTHER$=PROD$(NU)
800 NEED$(NU)=""
810 GOTO 480
820 '****** MESSAGE IF ILLEGAL TRADE ATTEMPTED ******

830 PRINT "sORRY.  BUT THE ";OCCUP$(NU);" DOES NOT NEED ANY ";PROD$(SELF);".
    HIT ENTER TO TRY AGAIN.";
840 INPUT A$:GOTO 480
850 CLS:PRINT:PRINT
860 '****** SCORE INCREMENTED WHEN CORRECT TRADE MADE ******

870 PRINT "CONGRATULATIONS."
880 PRINT " YOU MADE THE CORRECT TRADES IN "TRANS;" TRANSACTIONS."
890 SC(PLAYER)=SC(PLAYER)+TRANS
900 PRINT:PRINT
910 INPUT " PRESS ENTER TO CONTINUE";A$
920 RESTORE
930 TRANS=0
940 IF A=2 THEN NEXT PLAYER
950 NEXT L
960 '****** END OF GAME ******
```

```
970 CLS
980 PRINT
990 IF SC(0) <>0 THEN PRINT "YOUR SCORE :";SC(0):STOP
1000 PRINT "FINAL SCORE"
1010 PRINT
1020 PRINT "NAME","TRANSACTIONS"
1030 PRINT
1040 PRINT PL$(1),SC(1)
1050 PRINT PL$(2),SC(2)
1060 IF SC(1)=SC(2) GOTO 1090
1070 IF SC(1)<SC(2) THEN PRINT PL$(1);" WINS" ELSE PRINT PL$(2);" WINS"
1080 GOTO 1080
1090 PRINT "TIE GAME.  tRY AGAIN"
1100 GOTO 1100
1110 ' ****** PENALTY FORFEIT ******

1120 CLS:PRINT:PRINT
1130 PRINT "YOU FORFEIT TURN AND RECEIVE 10 PENALTY POINTS"
1140 SC(PLAYER)=SC(PLAYER)+10
1150 TRANS=0
1160 RESTORE
1170 PRINT
1180 INPUT " PRESS ENTER TO CONTINUE ";A$
1190 GOTO 940
```




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Vector Graphic, Inc., Thousand Oaks, CA.

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Infopro, Inc., Bensalem, PA.

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Index to microprocessor literature

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CP/M Review, Mercer Island, WA.

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Tradeshow reference

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Lorrie Morris Agency, Oceanside, CA.

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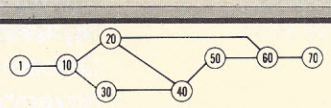
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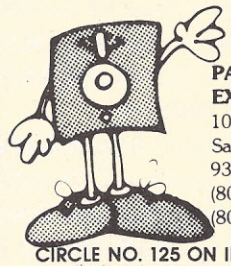
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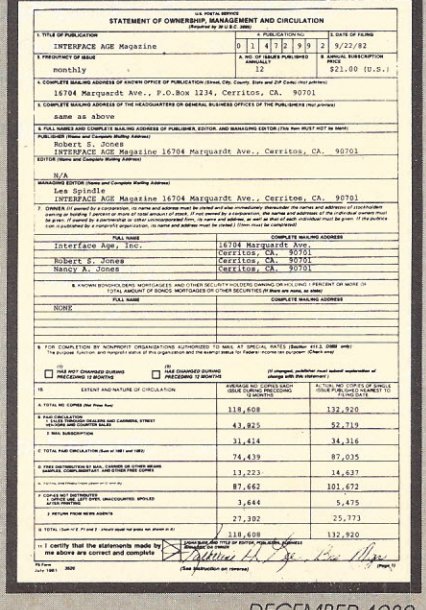


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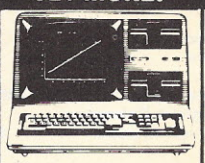
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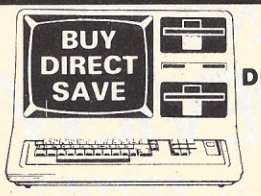
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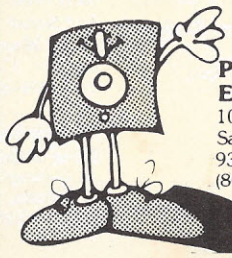
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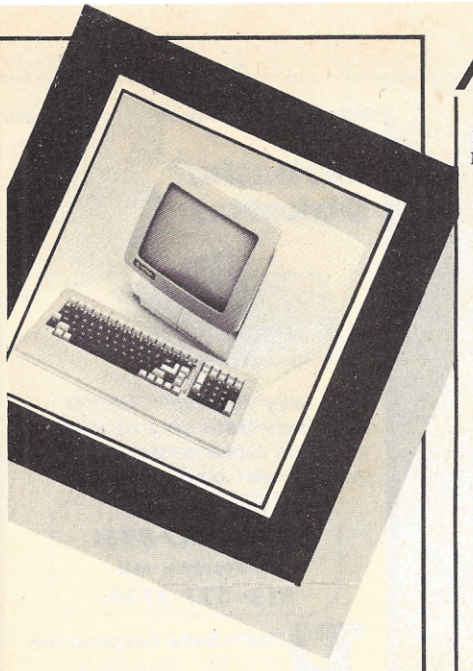
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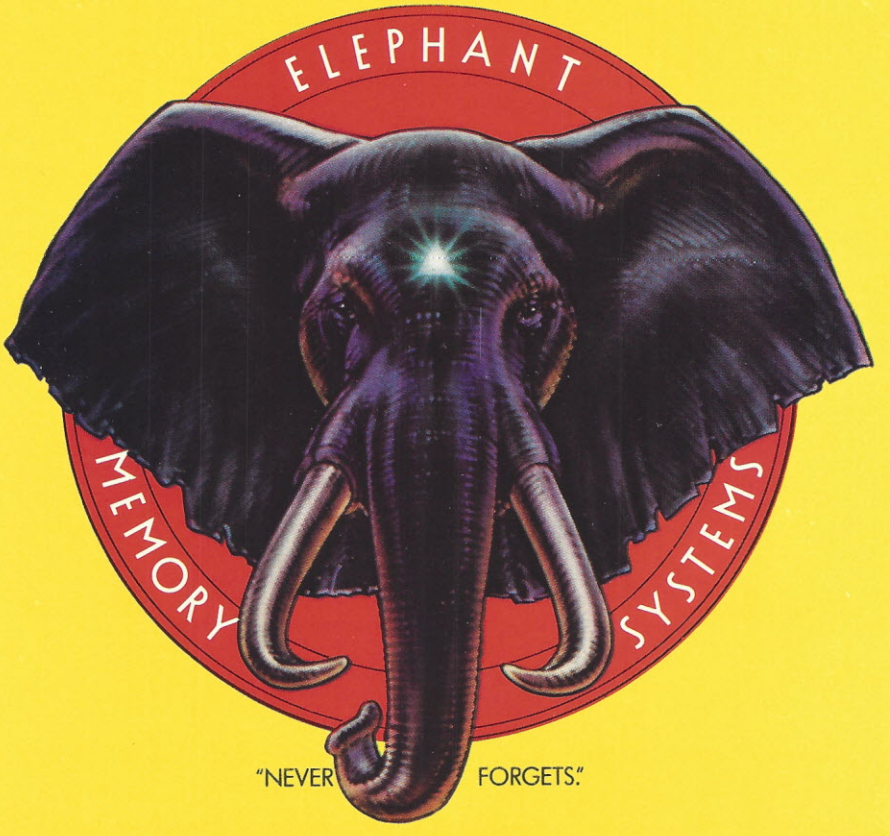
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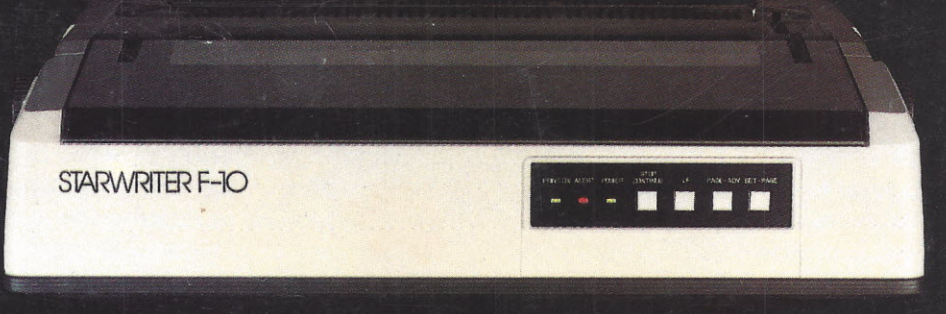
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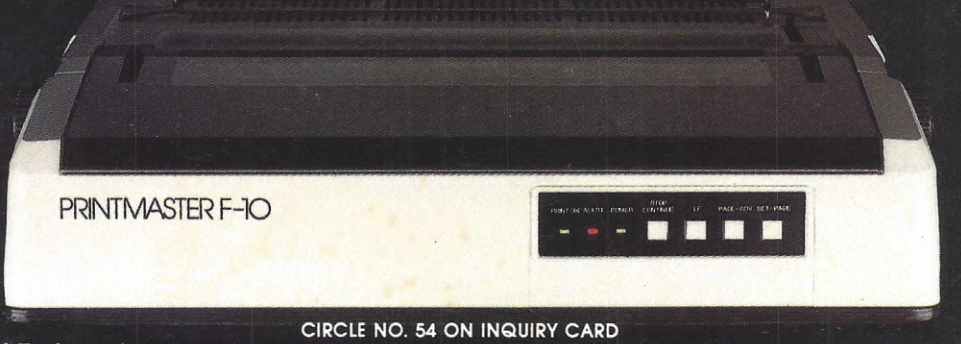
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